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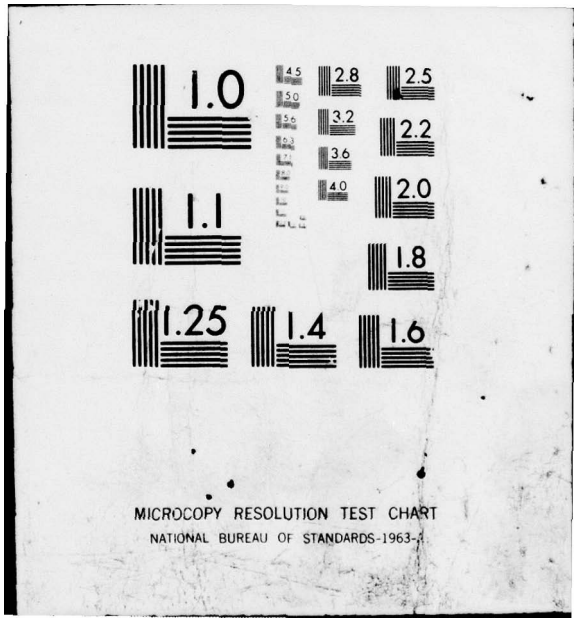
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Final Report

STATISTICAL ANALYSIS OF TERRAIN BACKGROUNDS AT CAMP A. P. HILL, VIRGINIA

ANTHONY J. LaROCCA
Infrared and Optics Division

AUGUST 1979

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NOTICES

Sponsorship: The work reported herein was conducted by the Environmental Research Institute of Michigan for the Naval Weapons Center, China Lake, California, under Contract Number N60530-78-C-0009. The Project Manager was Dr. Jon Wunderlich. Contracts and grants to the Institute for the support of sponsored research are administered through the Office of Contracts Administration.

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Terrain Backgrounds, IR Imagery, Statistical Analyses, Multispectral Data

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Data from infrared imagery on various terrain backgrounds have been collected by the Environmental Research Institute of Michigan and have been analyzed to present their statistical features. This work is being funded by the Optical Signatures Program to Support Navy Requirements. This report describes some of the characteristics in the form of histograms,

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micrometers

Abstract (Cont.)

ellipse "pictures", and power spectra for the following infrared spectral bands: 2.0-2.6, 4.5-5.5, and 8.0-14.0 μm. Special areas were chosen to demonstrate the variation in results with changes in the diurnal cycle.

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SUMMARY

The work described herein was funded by the Optical Signatures Program to Support Navy Requirements. Data from infrared (IR) imagery on various terrain backgrounds in the vicinity of Camp A.P. Hill, Virginia have been collected by the Environmental Research Institute of Michigan and have been analyzed to present their statistical features. The data were collected by the ERIM M-7 scanner, a multispectral scanner which operates in several wavelength bands in the visible and infrared portions of the electromagnetic spectrum. The imagery was collected with the scanner looking directly downward.

The area analyzed in this report is depicted in photographic imagery and in greymaps shown in the body of the report. The characteristics of the IR imagery and of the flight conditions are described in detail. The scanner footprint in the processed data is approximately a 1.6 foot square. The statistics calculated have been presented in figures and tables in the body of the report as histograms, spectral correlations, ellipses, and power spectra.

Histograms of probability-of-occurrence of the signal values are presented in terms of spectral radiance for the 2.0-2.6 μm wavelength band, and in terms of apparent temperature in the 4.5-5.5 μm and 8.0-14.0 μm wavelength bands. The relationship between the temperature and radiance statistics of the three thermal bands is discussed in the text.

Spectral correlations are presented to show relationships between the signals of the various channels. These are given along with means and standard deviations for the different bands and the various scenes.

Ellipse representations of scene features are presented, depicting area sizes which occur above (or below) given threshold levels. The

basis for the formation of ellipses is described in an earlier report [1]. Each ellipse represents certain features in the scene in area and general orientation, except that the area is specialized to a simple geometric form.

Power spectra of each of the scenes are presented for comparing results of different spectral regions.

1. R. Spellicy, J. Beard, and J. R. Maxwell, Statistical Analysis of Terrain Background Measurements Data, Report 120500-12-F, ERIM, March 1977.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the invaluable assistance of Ms. Abby Liskow in performing the extensive computer operations necessary for the successful completion of the analyses.

Under the supervision of Mr. Stephen Stewart, data were collected on the flight by instrumentation specialists Mr. Jimmie Ladd and Mr. William Juodawlkis. The data collection effort was supported by the Night Vision Laboratory of the Army's Mobility Equipment Research and Development Command at Ft. Belvoir, Virginia, whose assistance is gratefully acknowledged.

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1

INTRODUCTION

As part of a program to derive statistical information on the electromagnetic (EM) characteristics of various terrain backgrounds, selected areas of multispectral imagery obtained during March, 1978 in the vicinity of Camp A.P. Hill, Va. with ERIM's M7 scanner were analyzed. The backgrounds investigated at this particular site were primarily small stands of leafless deciduous and coniferous trees interspersed among open areas of forest carpet. Adjacent to this rugged scrub-brush area was a large field of bare soil. In general, the terrain could be classified as typical of a military tactical environment.

An aerial photography of the site is shown in Figure 1. As can be seen, the test site also contains several classes of vehicular targets under differing amounts of ground cover. Although these targets (which were continually repositioned throughout the data collection effort) were incidental to this program's interests and, therefore, were essentially ignored in the analysis reported herein, they do indeed stand out in certain of the results as will be evident later.

The actual IR thermal images analyzed in this study are shown in Figures 2, 3, and 4. These images are actually reversed left-to-right with respect to the actual scene since the computer display which produced them normally progresses from left to right while the M7 infrared sensor scans in the opposite direction. This nuance was not corrected as it has only cosmetic impact upon the reported results. For the sake of consistency, the aerial photograph (Figure 1) was purposely reversed to coincide with the imagery.

The M7 infrared sensor used to collect these data is a multispectral scanner operating in several bands in the visible and IR regions of the EM spectrum. The scene image data, along with signals from several calibration sources, are digitally recorded on High Density Digital Tape (HDDT) and later reformatted to Computer Compatible Tapes (CCT) from which the analyses are made. More detailed information on the scanner system are given in Reference 1.

1. R. Spellicy, J. Beard, and J. R. Maxwell, Statistical Analysis of Terrain Background Measurements Data, Report 120500-12-F, ERIM, March 1977.

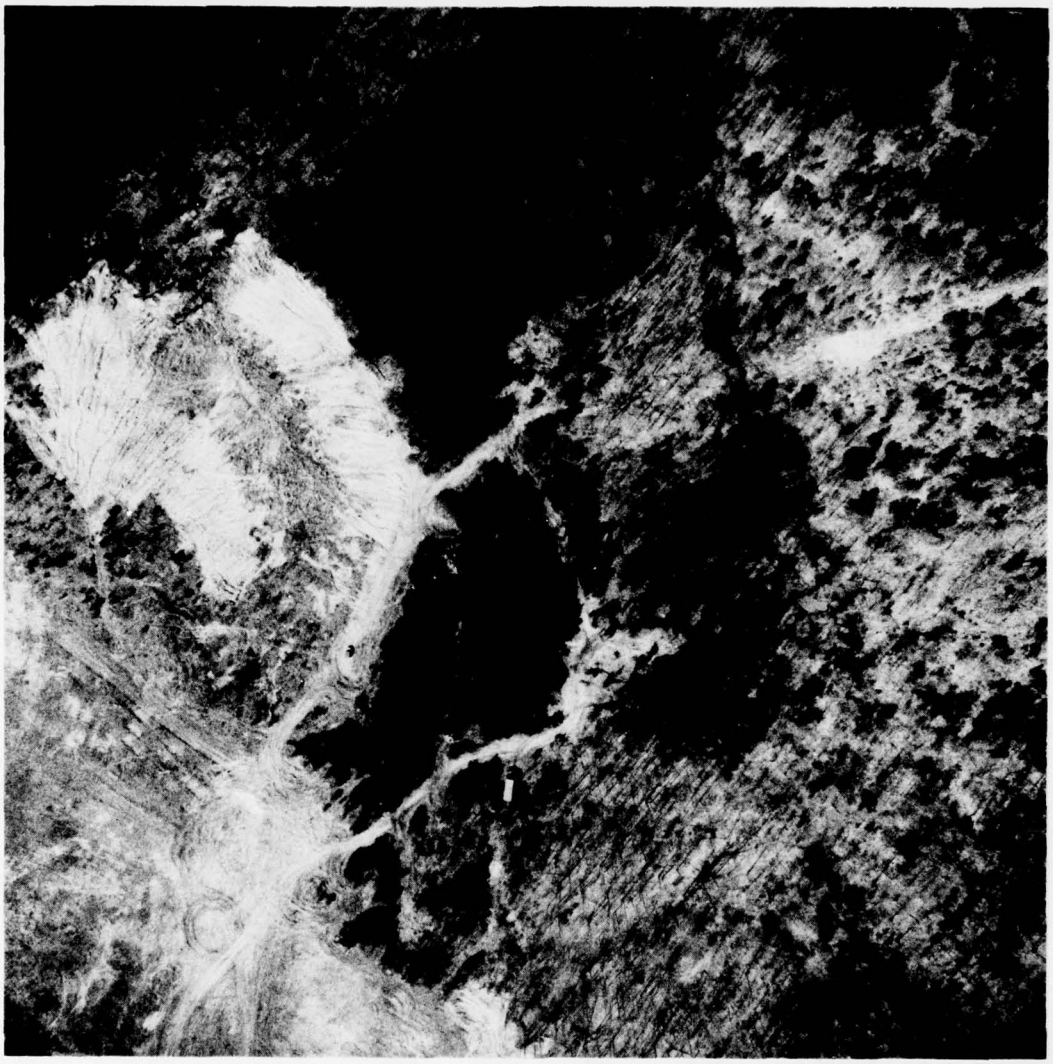
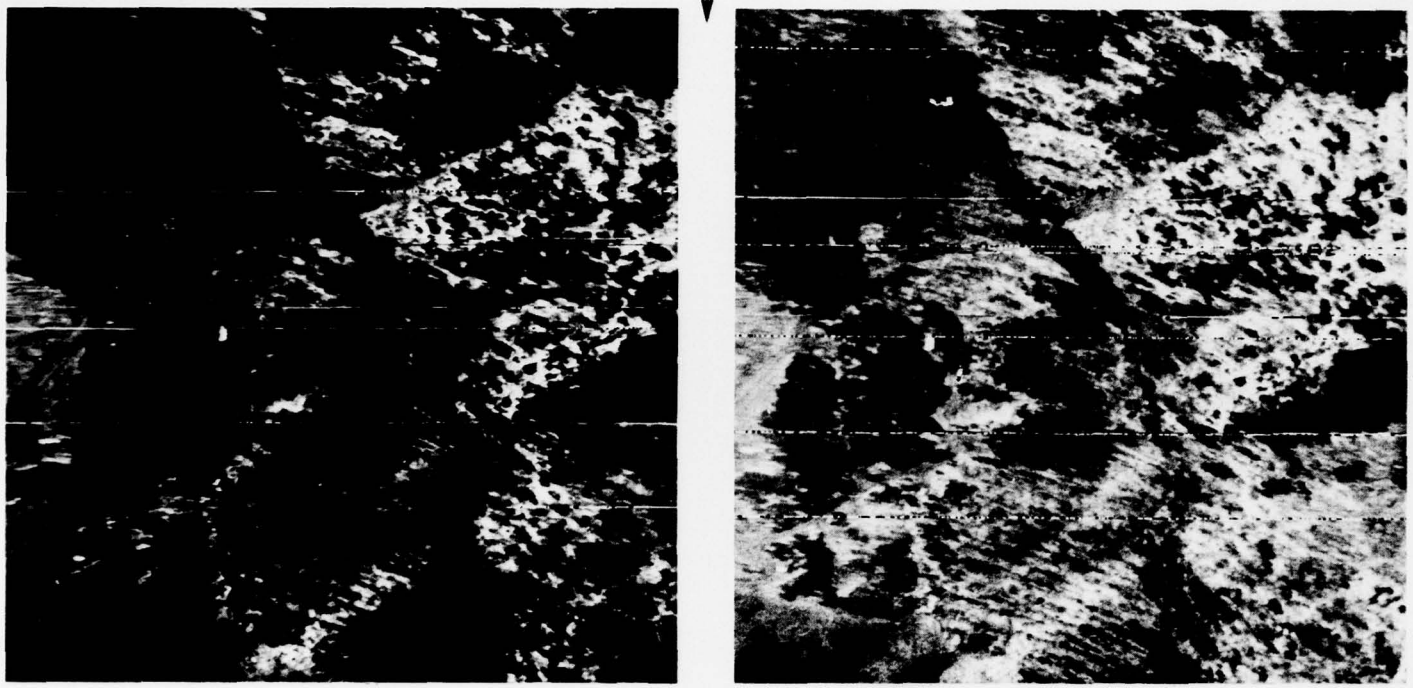


FIGURE 1. AERIAL PHOTOGRAPH OF CAMP A. P. HILL TEST AREA. Photo image is reversed left-to-right for compatibility with imagery scan direction.

Flight Direction

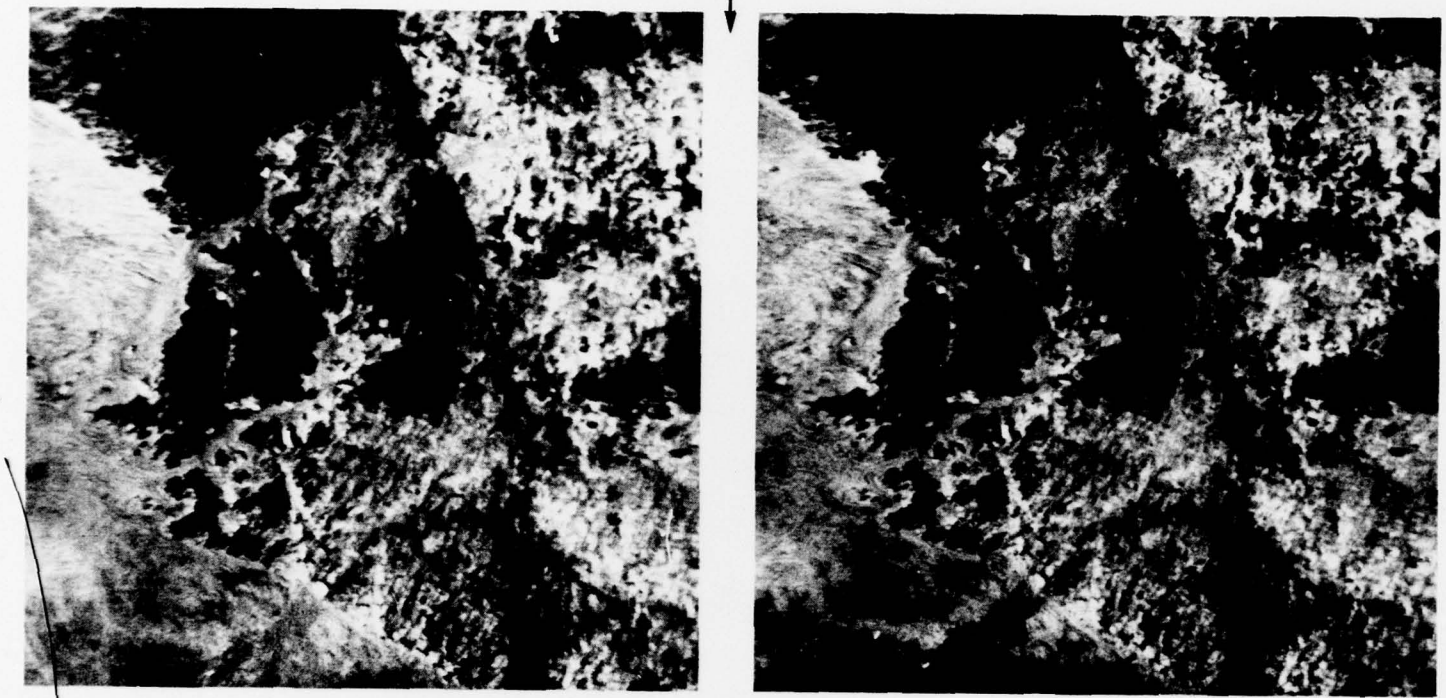


(a) 4.5 - 5.5 μm

(b) 8.0 - 14.0 μm

FIGURE 2. CAMP A. P. HILL AREA IMAGERY - MORNING

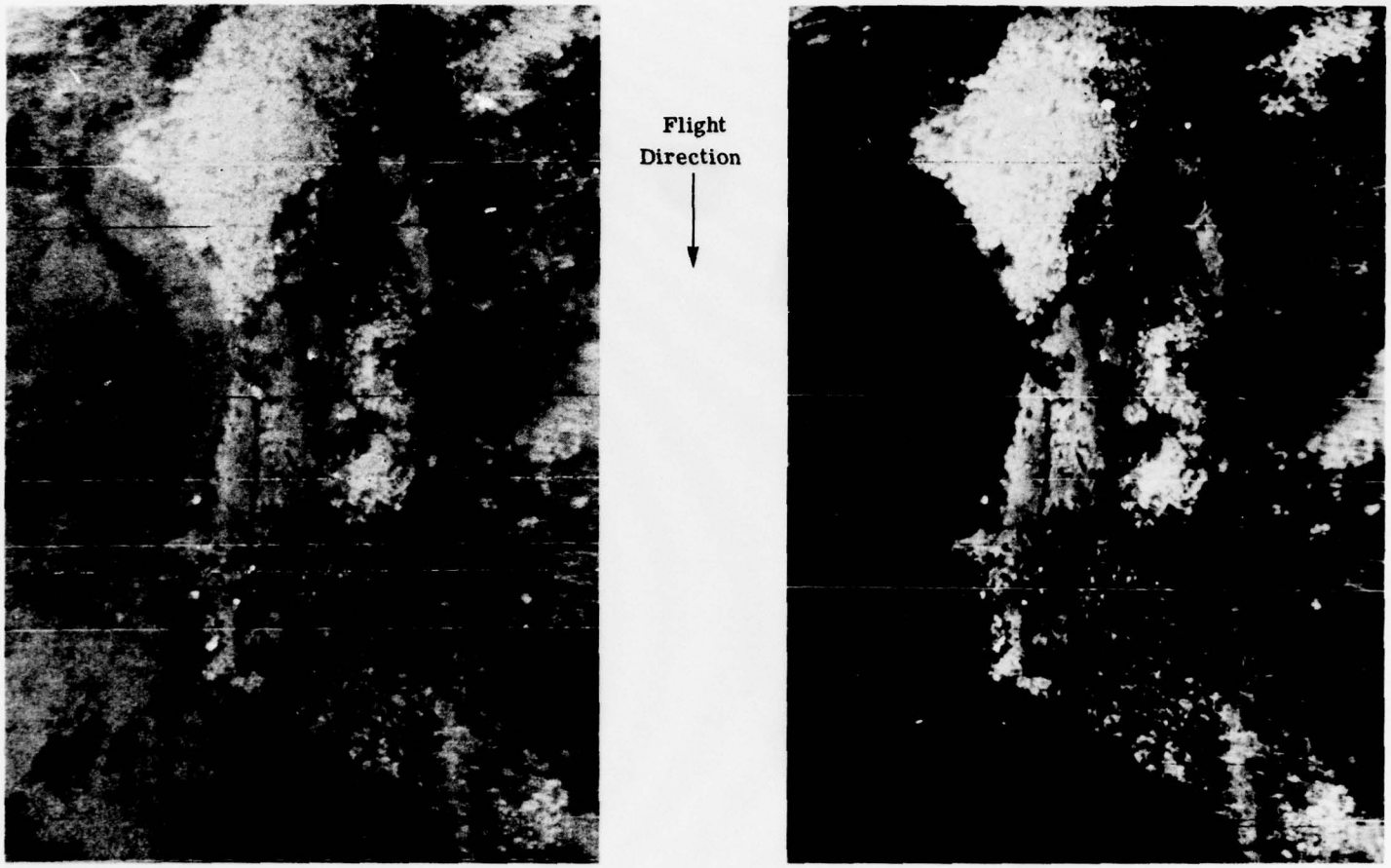
Flight Direction



(a) 4.5 - 5.5 μm

(b) 8.0 - 14.0 μm

FIGURE 3. CAMP A. P. HILL AREA IMAGERY - AFTERNOON



(a) 4.5 - 5.5 μm

(b) 8.0 - 14.0 μm

FIGURE 4. CAMP A. P. HILL AREA IMAGERY - MIDNIGHT

ERIM

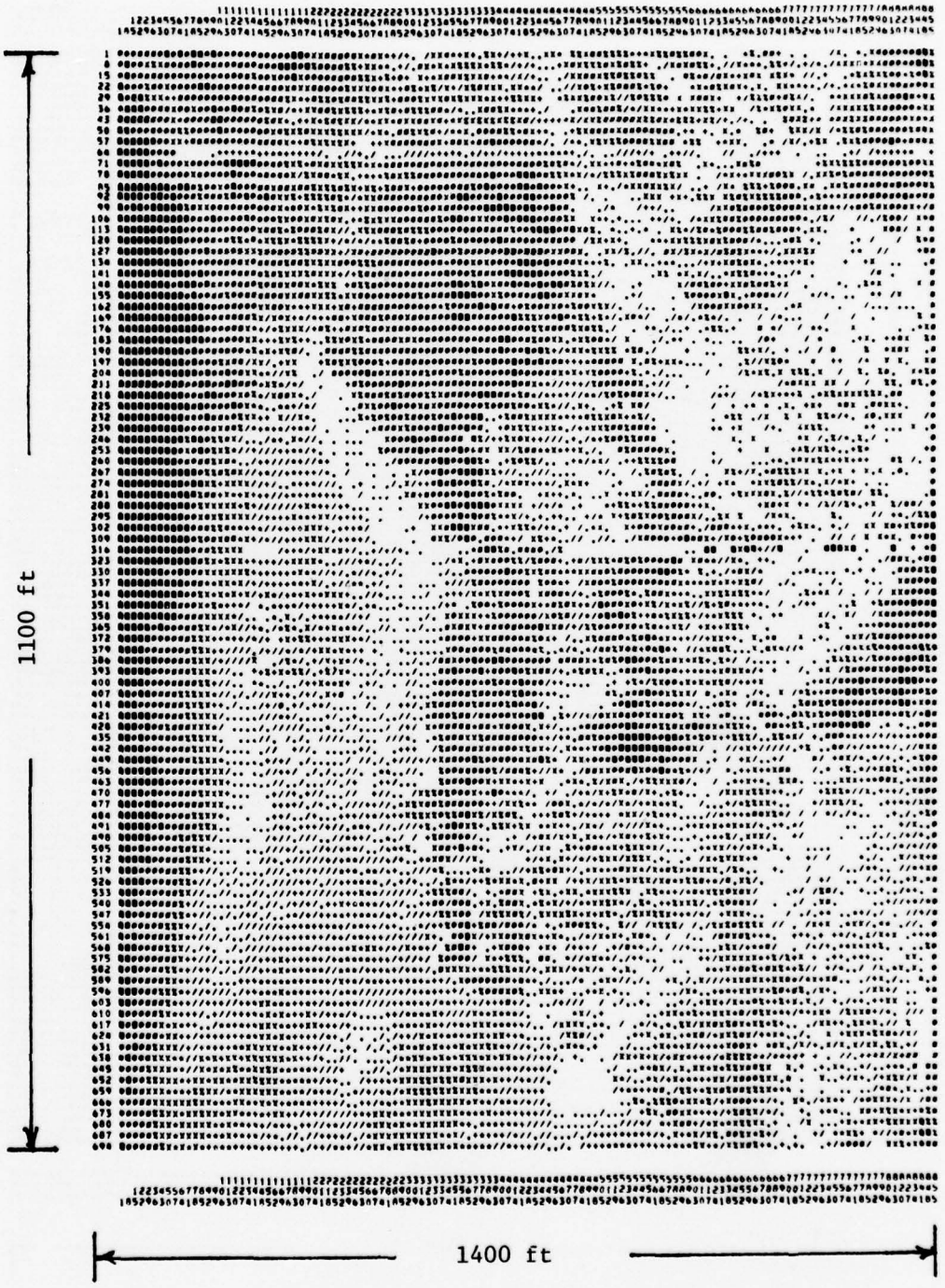
One of the features of the Camp A.P. Hill data set which provided added impetus to its analysis was the availability of background imagery at several different times in the diurnal cycle. Figures 2, 3, and 4 show imagery from three of the four times of day during which data were collected. Although imagery from the 1830 hours flight were not reproduced in this report, the results presented herein encompass all four collection times, namely, 0930 hours, 1330 hours, 1830 hours, and 2330 hours. General data parameters are described in Table 1.

The weather was clear on all flights so that the only significant environmental effects inherent in the data should be those due to the solar heating/cooling process and the attenuation effects of the atmosphere intervening between the sensor and the terrain. The flight line direction and areal site coverage was essentially identical for all data collection times.

There were occasional anomalies in this data set which were caused by instrumentation problems.* Wherever possible, these anomalies were digitally corrected before proceeding with the analysis. Those which could not be corrected and, therefore, increase the uncertainty of the report results are noted in the text.

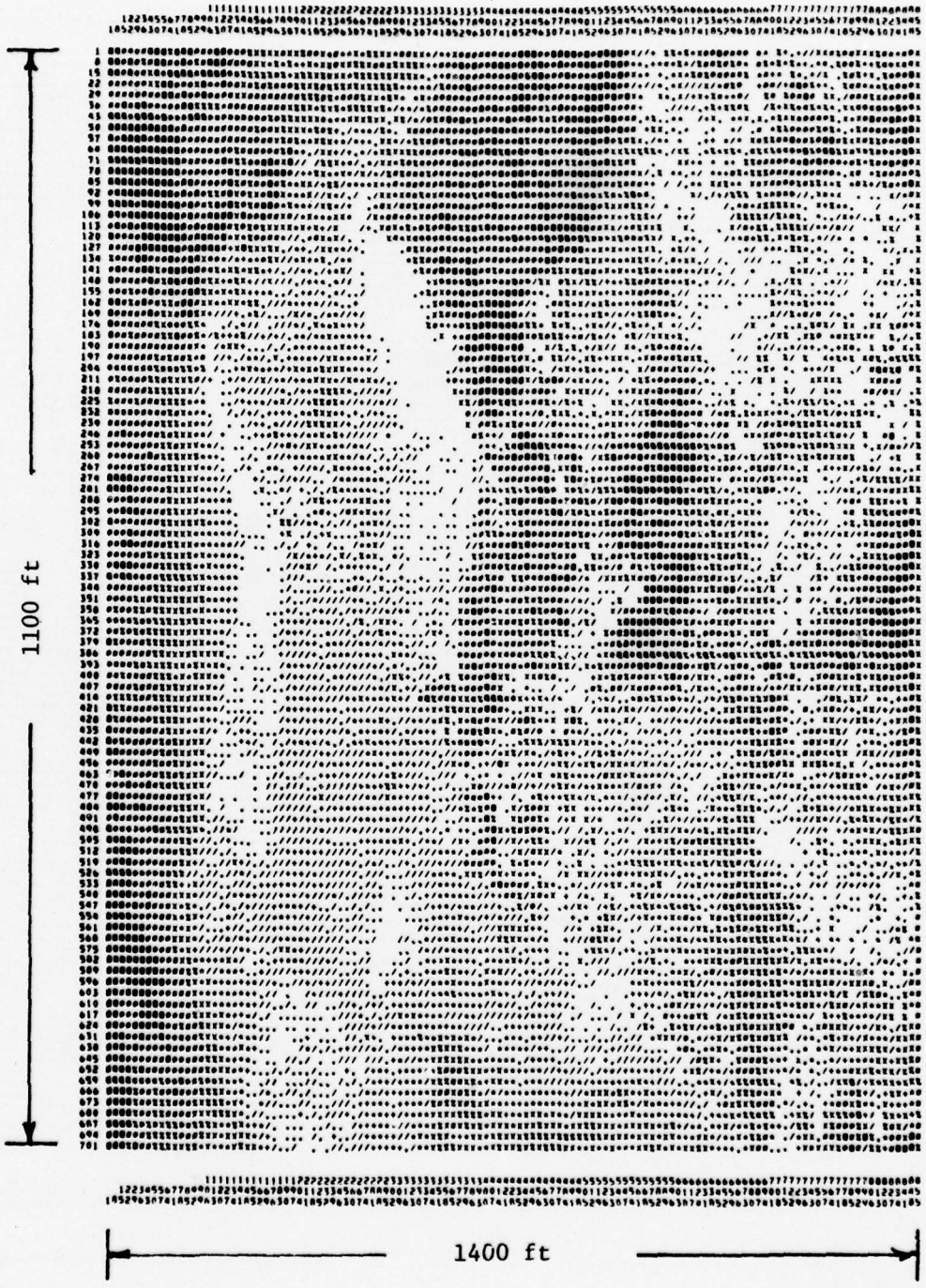
The actual regions from the Camp A.P. Hill data which were analyzed for background statistics are delineated by the imagery boundaries shown in Figures 2, 3, and 4, and in the greymaps of Figures 5, 6, 7 and 8. The sections analyzed are found on the greymaps with the line numbers given on the left-edge and pixel numbers given on the top and bottom. Every seventh line and pixel number is shown. Since the data were collected with contiguous sampling at 1.6 ft intervals in both dimensions, the areas analyzed can be determined exactly. The dimensions in feet shown on the greymaps are approximate. The analyses for this effort take the following forms: histograms, spectral correlations, ellipses, and power spectra.

*For example, loss of electronic synchronization would sometimes cause the recorder to lose a few scan lines of data.



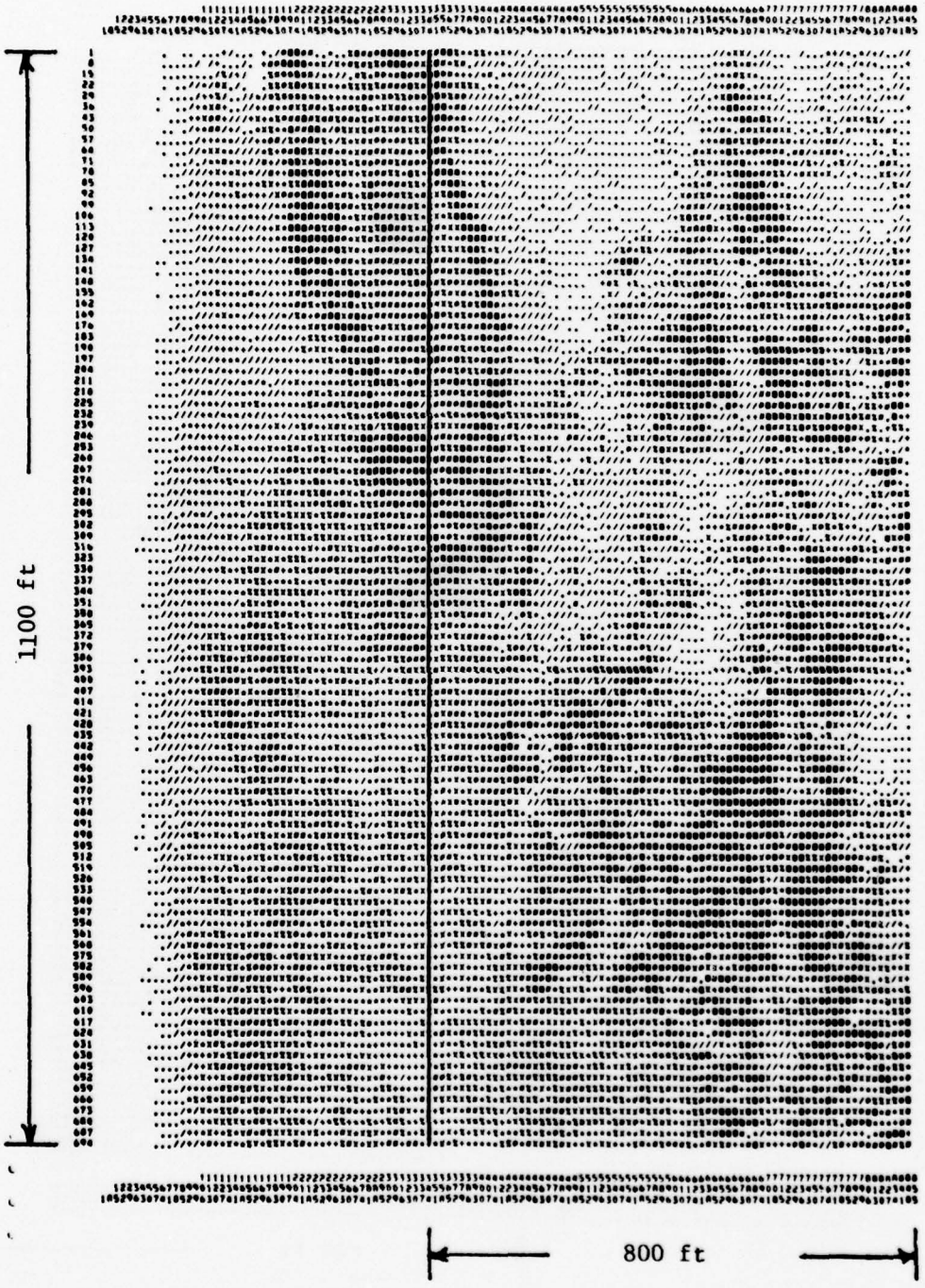
Note: Because of vertical-to-horizontal asymmetry of scale in the line printer, measured picture sizes are not consistent with indicated actual area sizes.

FIGURE 5. GREYMAP OF CAMP A.P. HILL AREA - MORNING
(Time: 0930, $\Delta\lambda$: 4.5-5.5 μm)



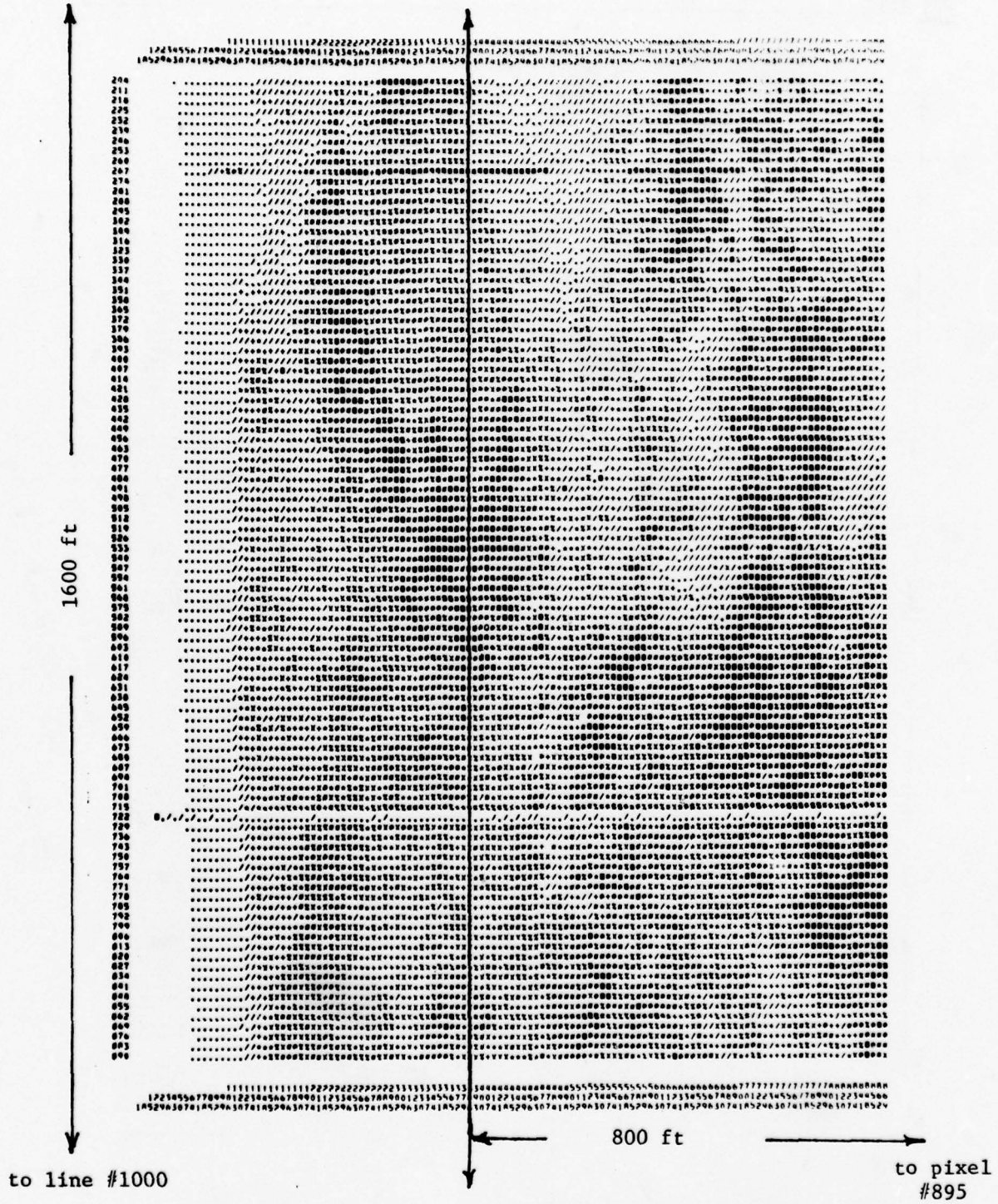
See note on Figure 5.

FIGURE 6. GREYMAP OF CAMP A.P. HILL AREA - AFTERNOON
(Time: 1330, $\Delta\lambda$: 4.5-5.5 μm)



Note: Because of vignetting on the left side, only that portion starting with pixel #344 was used. See also note on Figure 5.

FIGURE 7. GREYMAP OF CAMP A.P. HILL AREA - EVENING
(Time: 1830, $\Delta\lambda$: 4.5-5.5 μm)



Note: Because of vignetting on the left side, only that portion starting with pixel #384 was used. See also note on Figure 5.

FIGURE 8. GREYMAP OF CAMP A.P. HILL AREA - MIDNIGHT
(Time: 2330, $\Delta\lambda$: 4.5-5.5 μm)

TABLE 1

PERTINENT INFORMATION ABOUT CAMP A.P. HILL DATA
(Dates of Flight: 28, 29, 30 March 1978)

Morning

Wavelength Bands: 2.0-2.6 μm, 4.5-5.5 μm, 8.0-14.0 μm

IFOV: 2.0 mrad

Altitude: 800 ft Depression Angle: 90°

Time: 0930 hrs Flight Direction: West

Ground Speed: 168 $ft\text{-}sec^{-1}$

Area Covered (Approx.): 1100 ft long x 1400 ft wide

Weather: Clear

Afternoon

Wavelength Bands: 2.0-2.6 μm, 4.5-5.5 μm, 8.0-14.0 μm

IFOV: 2.0 mrad

Altitude: 800 ft Depression Angle: 90°

Time: 1330 hrs Flight Direction: West

Ground Speed: 168 $ft\text{-}sec^{-1}$

Area Covered (Approx.): 1100 ft long x 1400 ft wide

Weather: Clear

TABLE 1 (Concluded)

Evening

Wavelength Bands: 4.5-5.5 μm, 8.0-14.0 μm

IFOV: 2.0 mrad

Altitude: 800 ft Depression Angle: 90°

Time: 1830 hrs Flight Direction: West

Ground Speed: 168 $ft\text{-}sec^{-1}$

Area Covered (Approx.): 1100 ft long x 800 ft wide

Weather: Clear

Midnight

Wavelength Bands: 4.5-5.5 μm, 8.0-14.0 μm

IFOV: 2.0 mrad

Altitude: 800 ft Depression Angle: 90°

Time: 2330 hrs Flight Direction: West

Ground Speed: 168 $ft\text{-}sec^{-1}$

Area Covered (Approx.): 1600 ft long x 800 ft wide

Weather: Clear

2
HISTOGRAMS

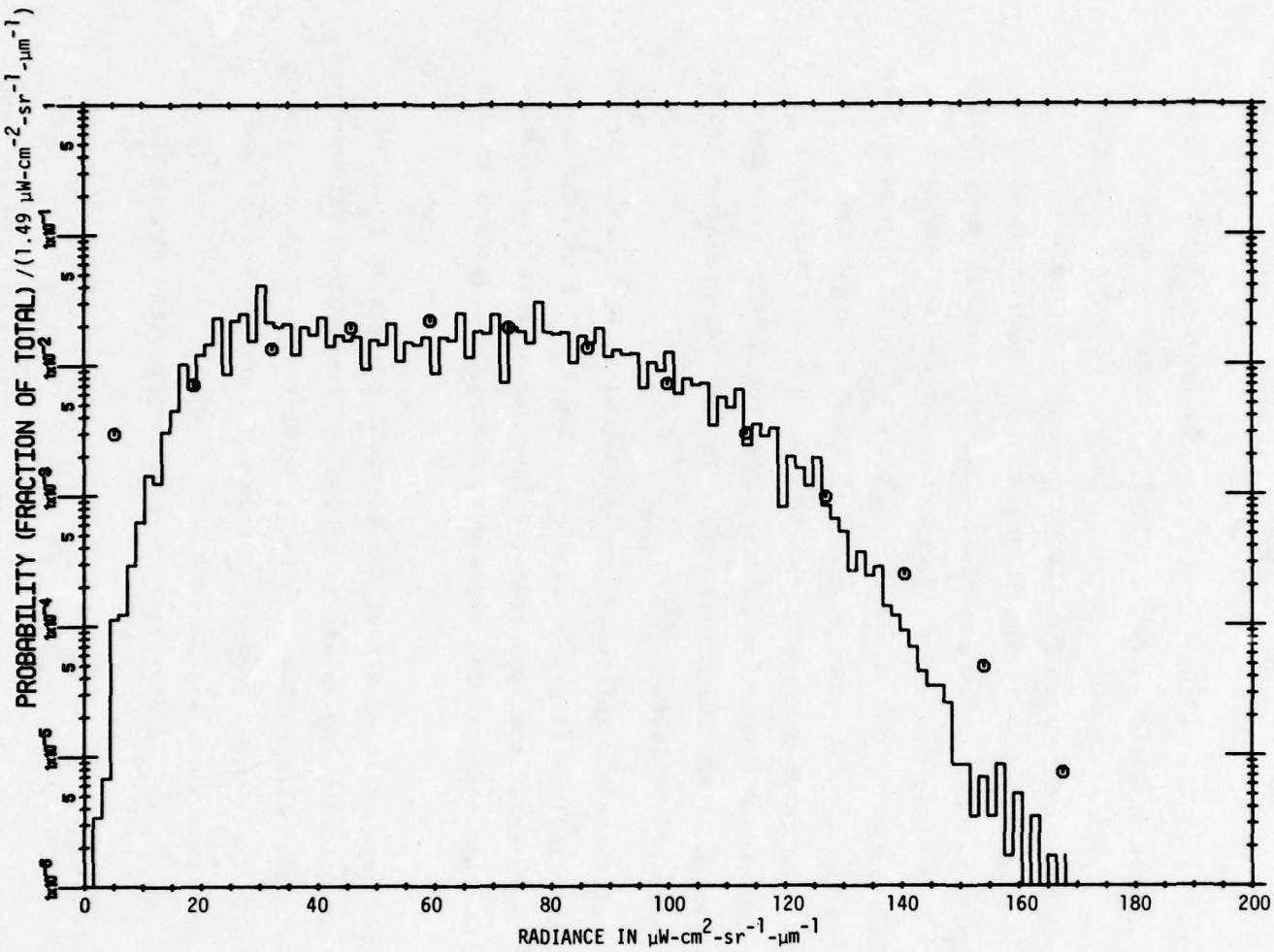
After the images are calibrated and computer-processed to achieve line-by-line contiguity, the data are stored on computer-compatible magnetic tape. For a given run, the pixel values are sorted by magnitude into data bins and counted for the purpose of creating histograms and computing mean values and standard deviations. From these results, apparent temperature histograms are plotted for the thermal bands while, in the 2.0-2.6 μm band, histograms are plotted in terms of spectral radiance. Histograms for the different runs are shown in Figures 9, 10, 11, and 12 for the morning, afternoon, evening and midnight cases, respectively. The curve defined by the circles in each figure is a plot of the Gaussian distribution corresponding to the same mean and standard deviation as for the actual data. The circles are separated by 1/2 σ (σ=standard deviation).

Because of the sun's influence, the data tend to be broader for the short wavelength regions (i.e., below 4 μm). The 2.0-2.6 μm histograms are plotted in terms of spectral radiance inasmuch as a reflected solar irradiance, and not temperature, represents the dominant source in this band.

We could have analyzed all of the spectral regions in terms of radiance, but reducing the values to equivalent temperature values makes intercomparison of data easier. In fact, in Reference 2, we did reduce the results in the thermal regions in terms of both temperature and radiance, and found that, within less than a 10% error, the radiance statistics can be deduced directly* from the temperature statistics

2. A. J. LaRocca and J. R. Maxwell, Statistical Analysis of Terrain Data, Report 132300-2-F, ERIM, February 1979.

* Strictly speaking, because of the non-linearity of the Planck equation, we should not expect to derive radiance statistics from temperature statistics through the Planck equation. However, the temperature range of values is sufficiently small to allow this to be done without incurring a large error.



Area: Camp A.P. Hill - Morning Wavelength = 2.0 - 2.6 μm
Mean = 59.36
Std. Dev. = 27.03

FIGURE 9a. HISTOGRAM OF CAMP A.P. HILL AREA

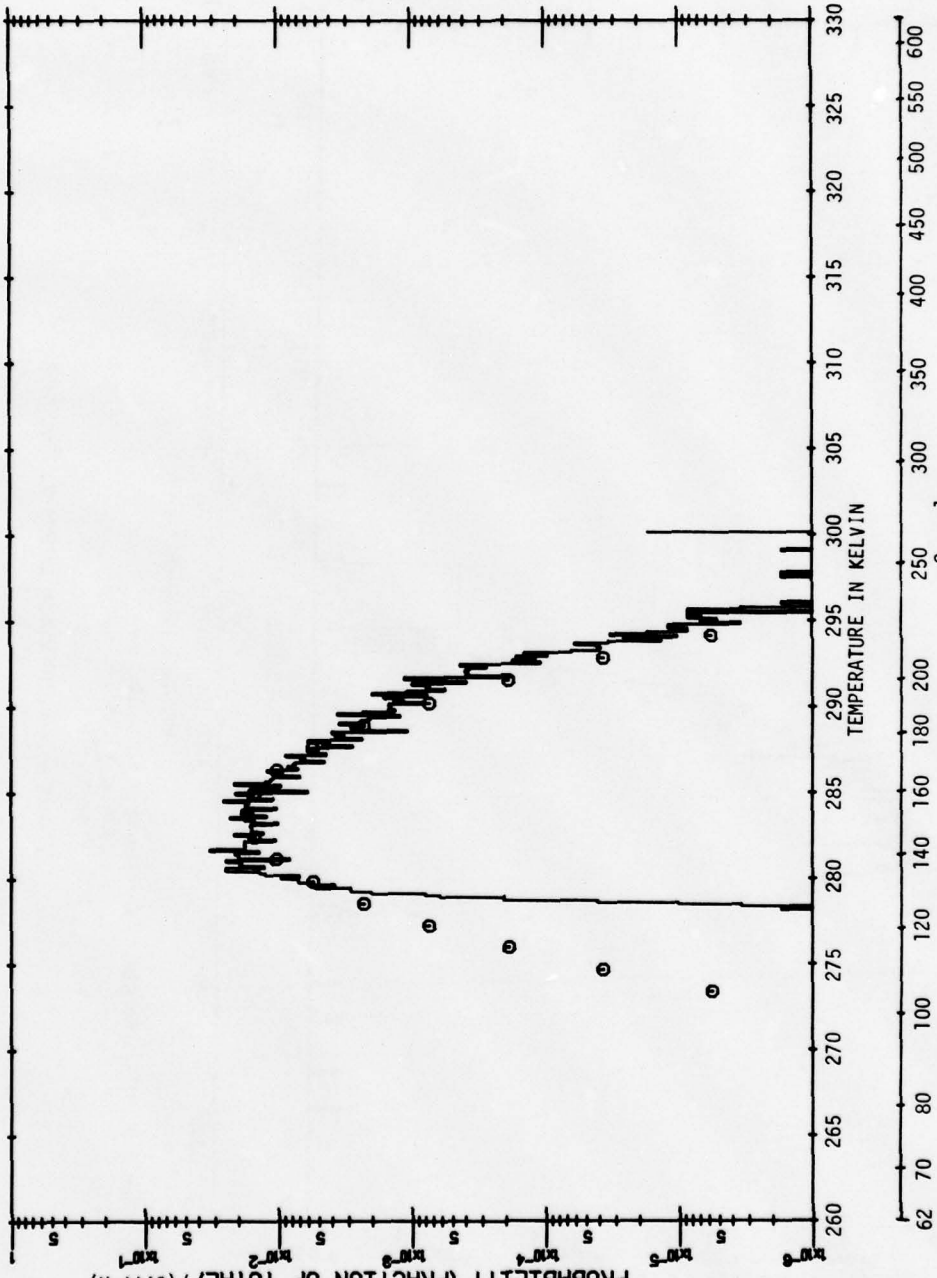
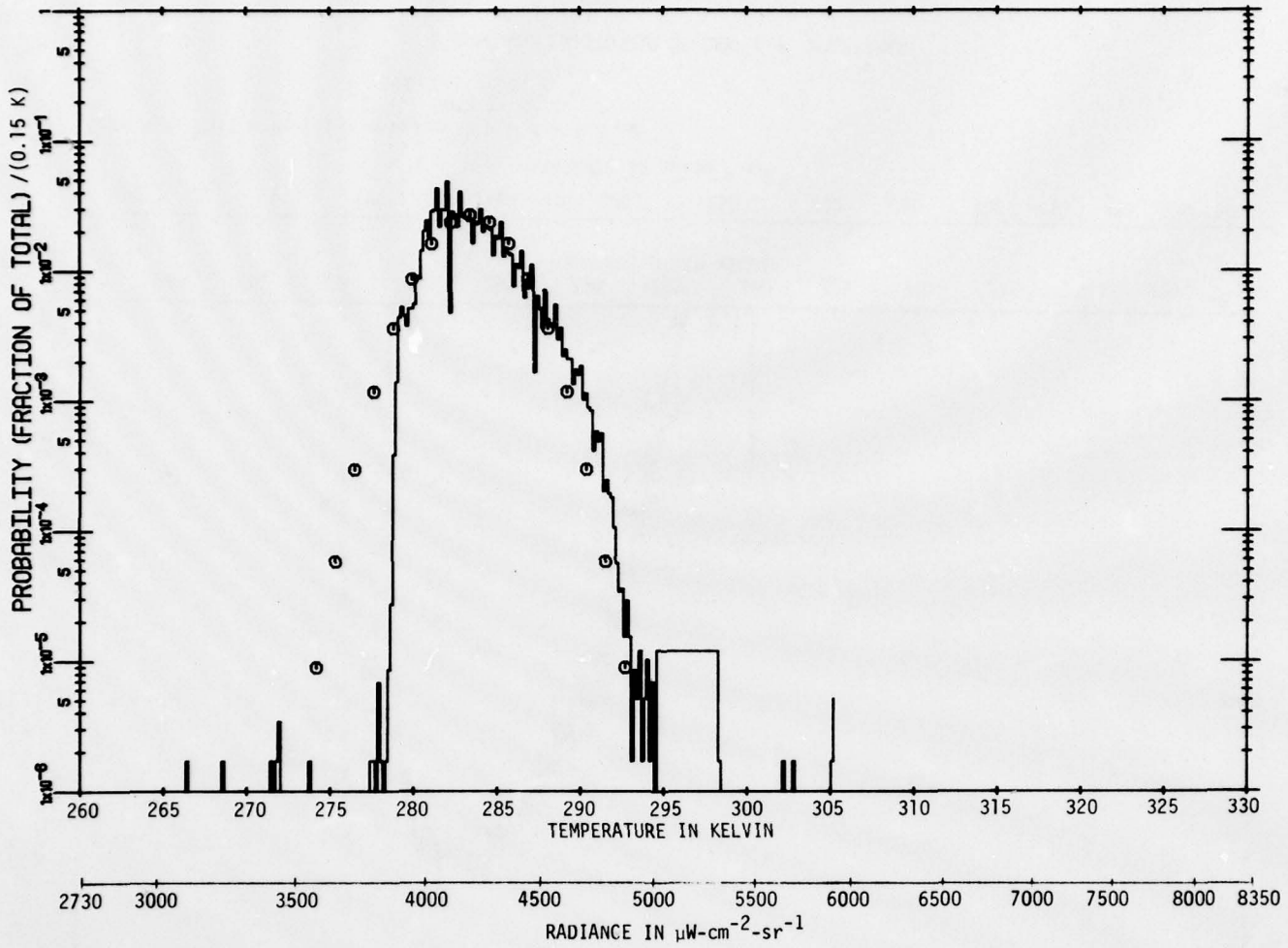
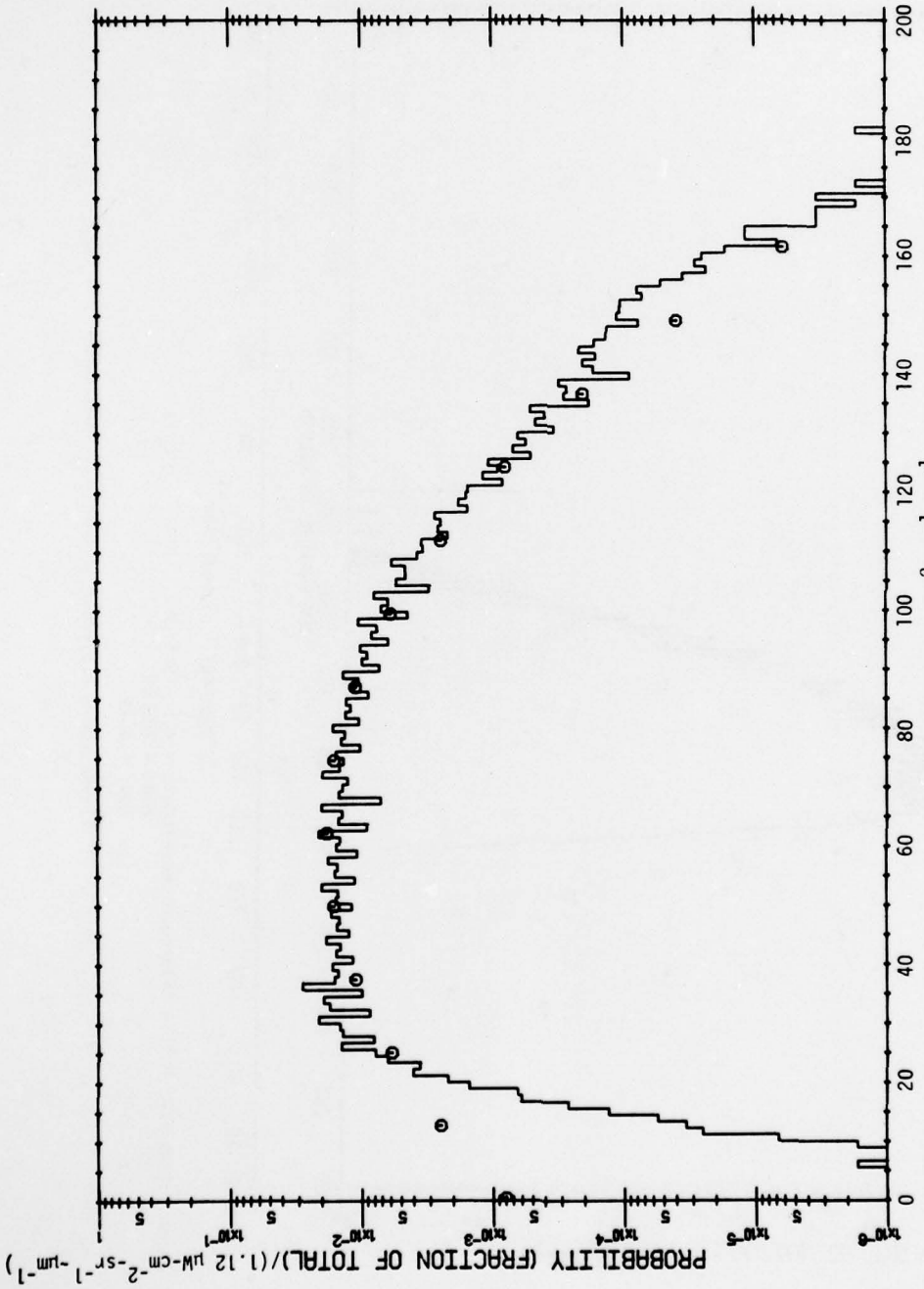


FIGURE 9b. HISTOGRAM OF CAMP A.P. HILL AREA



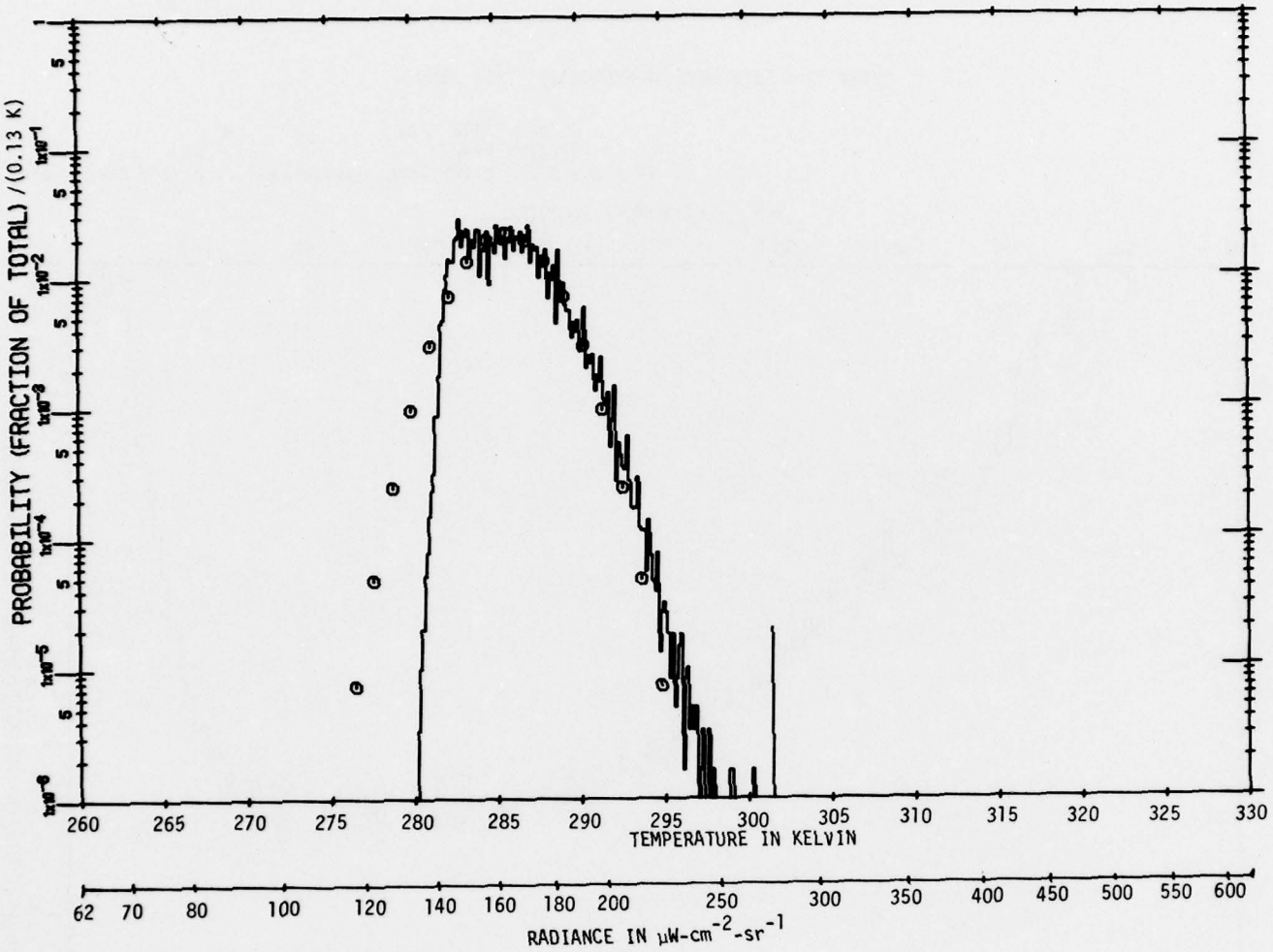
Area: Camp A.P. Hill - Morning Wavelength = 8.0 - 14.0 μm
Mean = 283.44
Std. Dev. = 2.31

FIGURE 9c. HISTOGRAM OF CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Afternoon Wavelength = 2.0 - 2.6 μm
Mean = 62.36
Std. Dev. = 24.79

FIGURE 10a. HISTOGRAM OF CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Afternoon Wavelength = 4.5 - 5.5 μm
Mean = 285.69
Std. Dev. = 2.29

FIGURE 10b. HISTOGRAM OF CAMP A.P. HILL AREA

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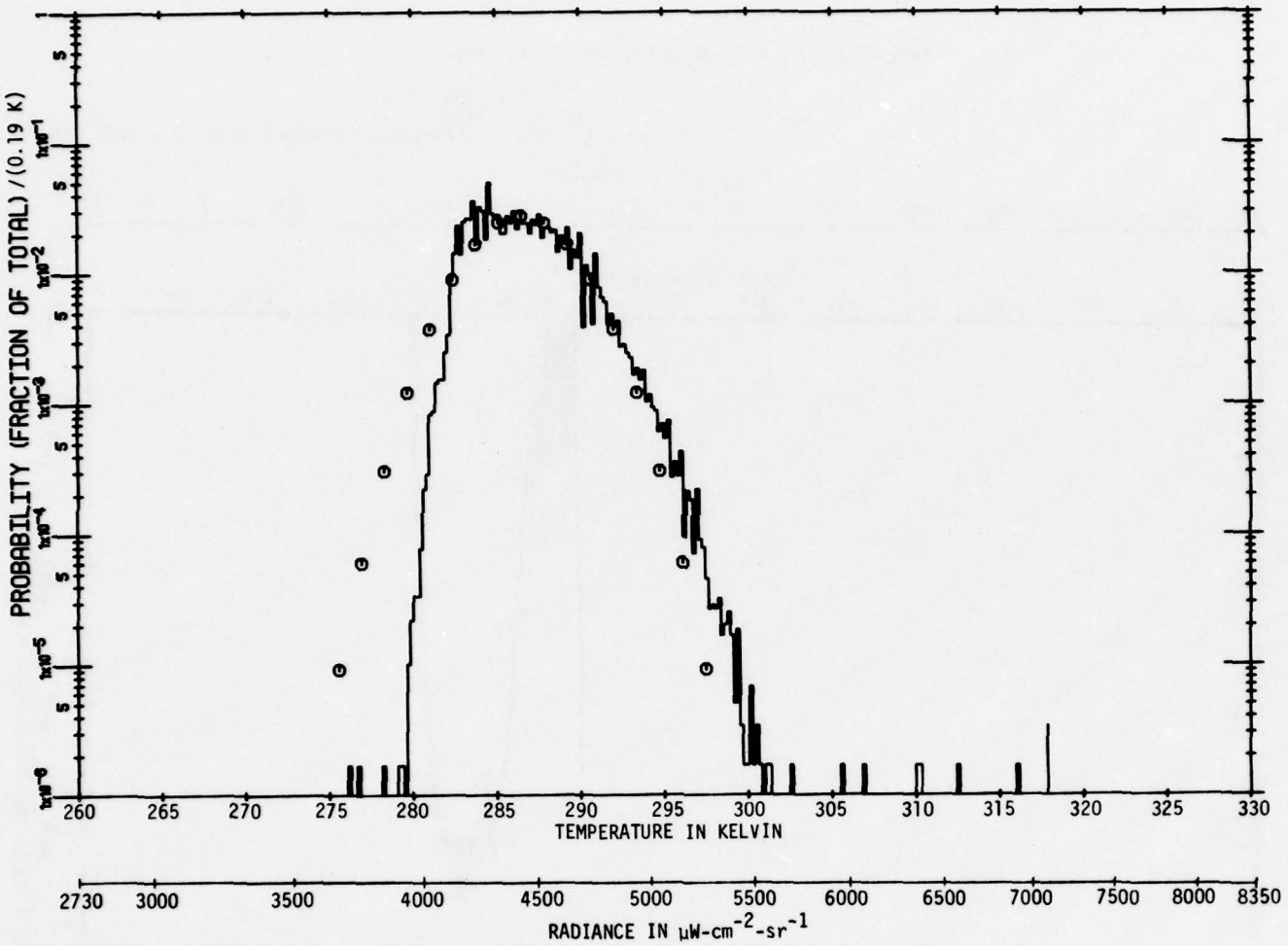
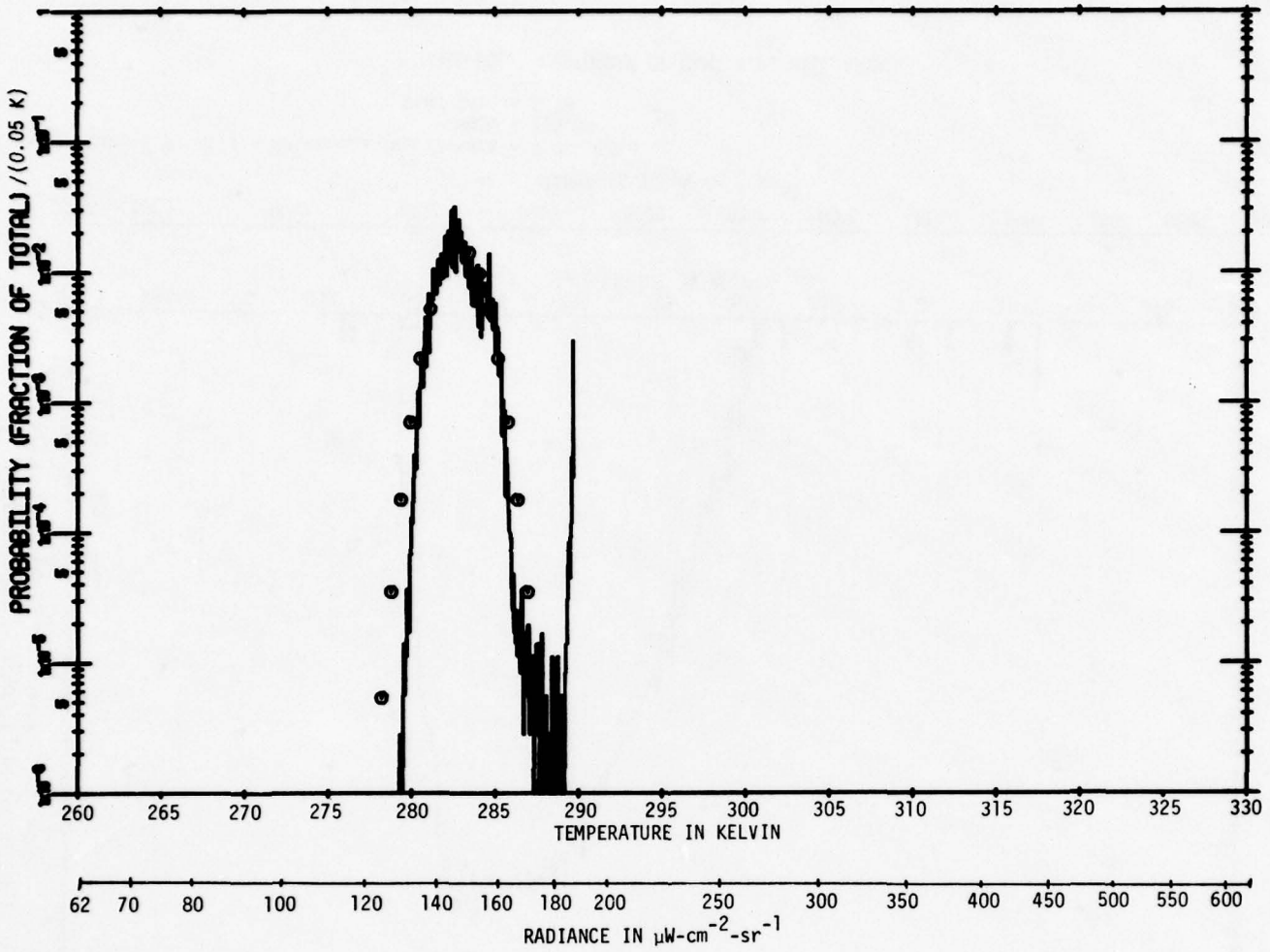


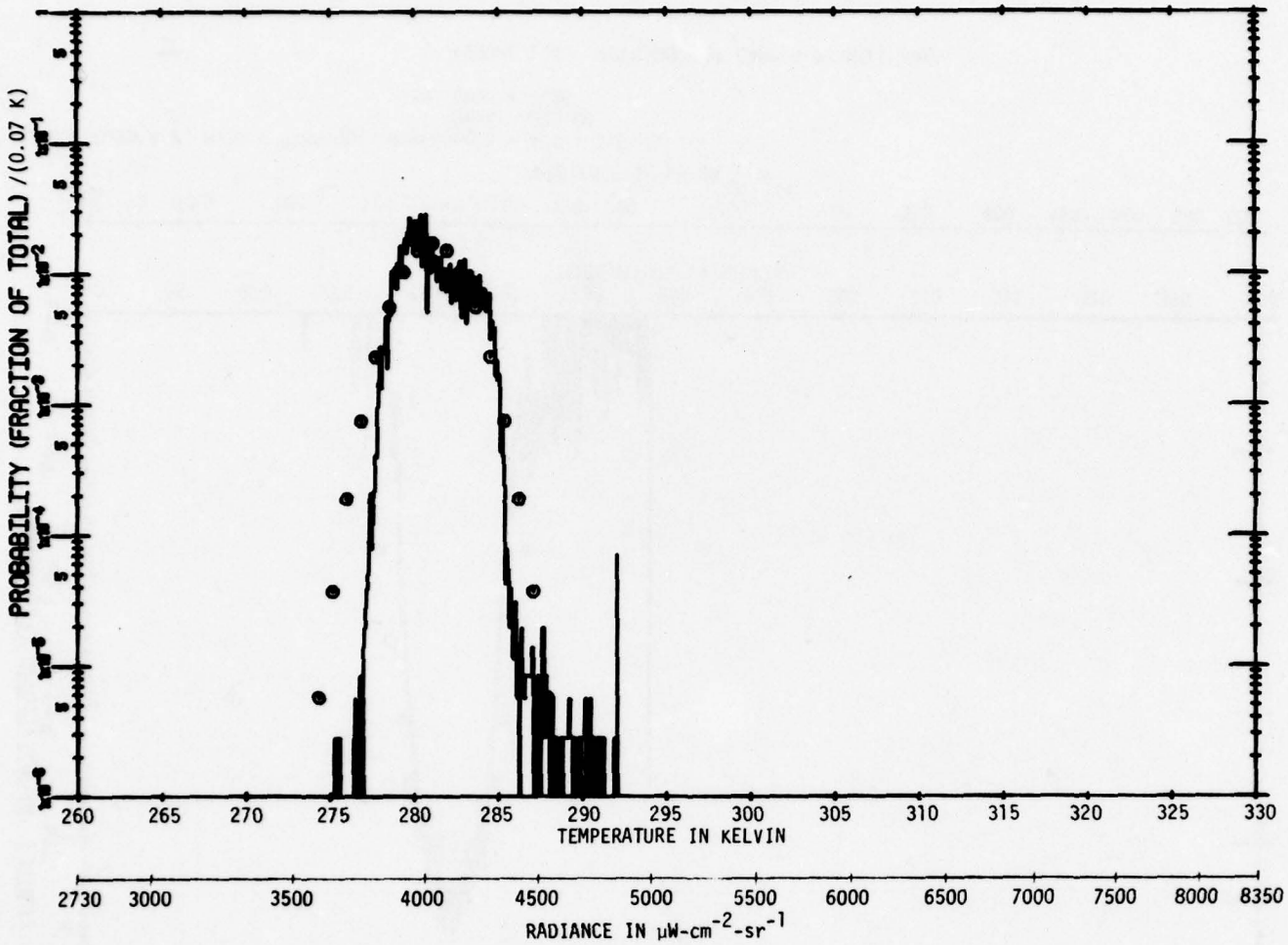
Area: Camp A.P. Hill - Afternoon Wavelength = 8.0 - 14.0 μm
Mean = 286.54
Std. Dev. = 2.74

FIGURE 10c. HISTOGRAM OF CAMP A.P. HILL AREA



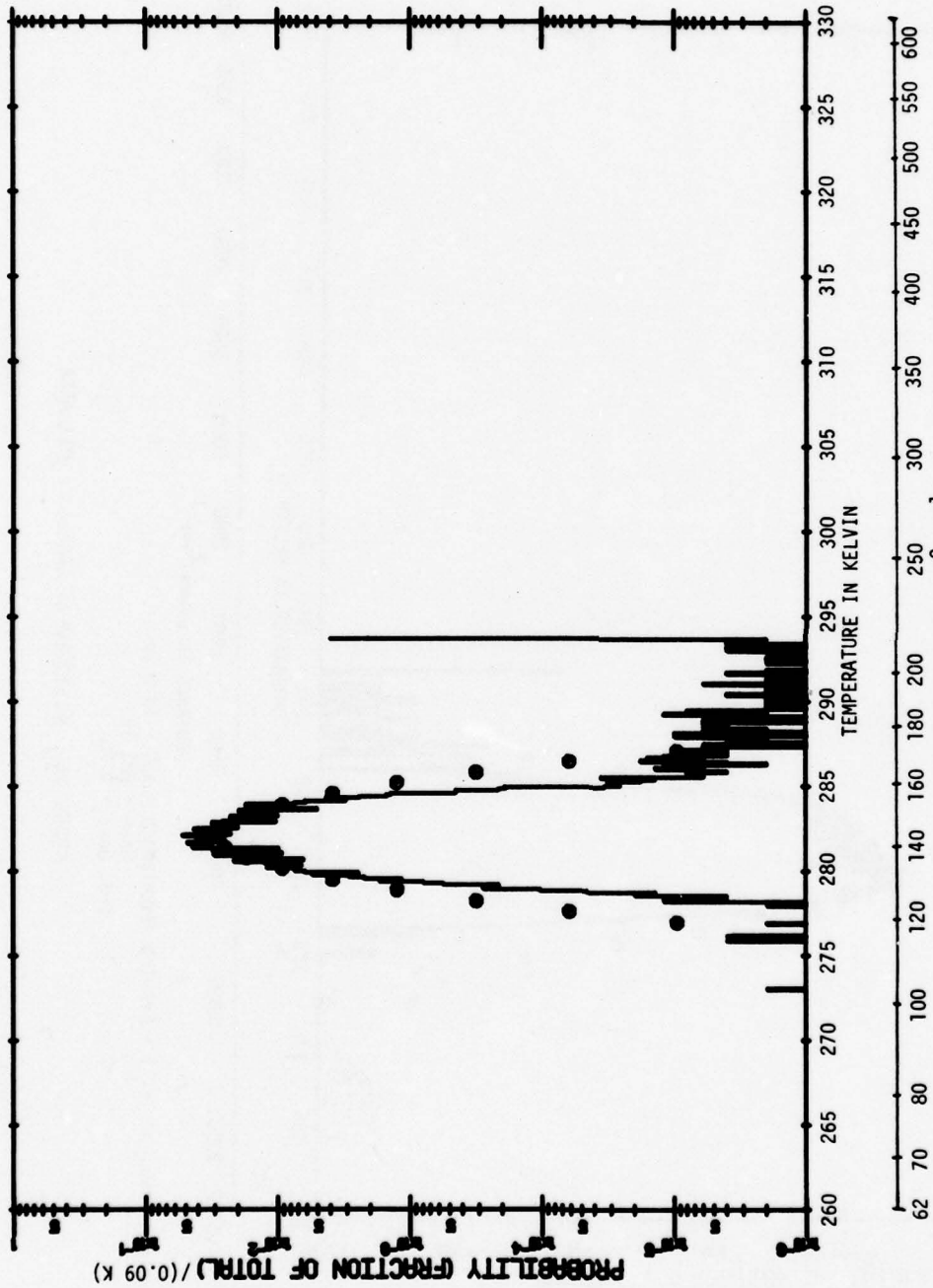
Area: Camp A.P. Hill - Evening Wavelength = 4.5 - 5.5 μm
Mean = 282.89
Std. Dev. = 1.17

FIGURE 11a. HISTOGRAM OF CAMP A.P. HILL AREA



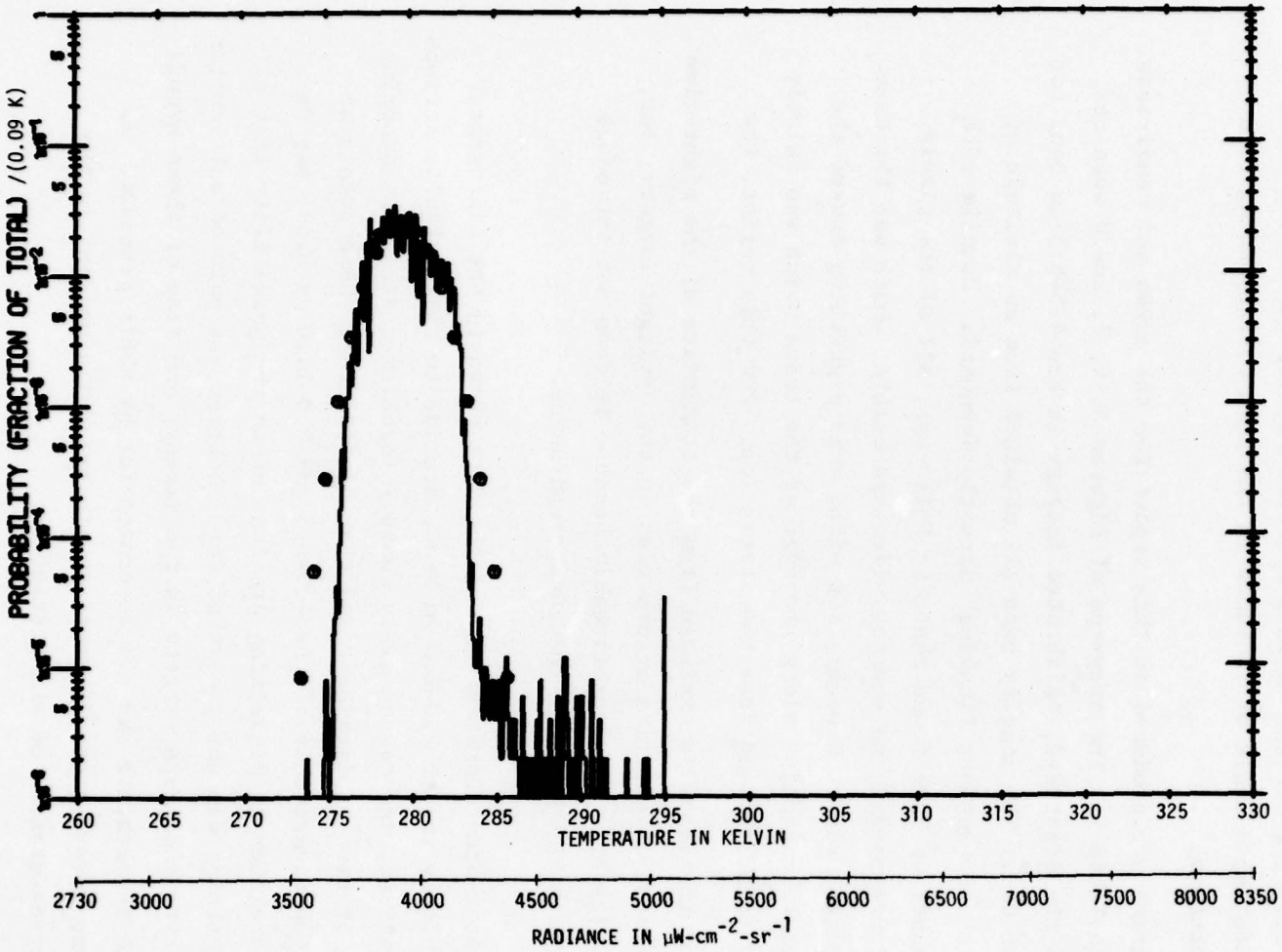
Area: Camp A.P. Hill - Evening Wavelength = 8.0 - 14.0 μm
Mean = 281.16
Std. Dev. = 1.70

FIGURE 11b. HISTOGRAM OF CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Midnight Wavelength = 4.5 - 5.5 μm
Mean = 282.00
Std. Dev. = 1.26

FIGURE 12a. HISTOGRAM OF CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Midnight Wavelength = 8.0 - 14.0 μm
Mean = 279.50
Std. Dev. = 1.54

FIGURE 12b. HISTOGRAM OF CAMP A.P. HILL AREA

through the Planck function. In view of this, we therefore omitted the radiance statistics for the thermal spectral region, and merely added to this histogram a scale of radiance in the band corresponding to a given temperature.

Histograms are produced in this report for the areas and conditions indicated in Table 1. The greymaps of Figures 5, 6, 7, and 8 were obtained from the digitized, calibrated imagery in the 4.5-5.5 μm band for all times of day. The imagery were all obtained from an altitude of 800 feet with the scanner "looking" directly downward. Usually with the M-7 scanner we have found that, in this case, all of the pixels in a line corresponding to scenery video are usable, which was the case for the daylight runs. However, for night runs vignetting caused the introduction of radiation along the edge of the scene which was falsely hot and had to be removed from the statistics. For this region, the left-edge of the image is excluded from the statistics of the night-time data. Of course, vignetting occurs alsc in the daylight imagery, but, relatively, its effect is unnoticeable because it does not introduce artifacts above the level of the background scene.

The fence-like character of all the data shown in the histograms, but particularly in the 2.0-2.6 μm band, are due to slight faulty actions of the digitizer, and cause mainly cosmetic problems, since the dropping and adding of bits of data here and there is evident. Some events at the high-temperature ends of the 4.5-5.5 and 8.0-14.0 μm bands may be suspect due either to digitizing problems or to the possibility that all of the vignetting was not accounted for. However, as pointed out earlier in the report, there are targets in the imagery and some of these events at the high temperature end are accounted for by their presence. As will be seen later, these discrete events are quite evident in the ellipse representation of the statistics.

It will be noted that the mean temperatures in the 4.5-5.5 and 8.0-14.0 μm histograms agree very closely, contrary to what we found in the Port Hueneme data (see Reference 3), where the 9.0-11.4 μm temperatures tended to be considerably warmer than those in the 4.5-5.5 μm band. This was explained by the conjecture that probably a non-equilibrium thermodynamics existed in which the air temperature was cooler than the surface temperature, and the humidity was high enough to cause considerable absorption in the 4.5-5.5 μm band.

In the night time situations in the Camp A.P. Hill data reported here, the temperatures are very close, but tend in the other direction; i.e., 4.5-5.5 μm temperatures are slightly warmer than those for the 8.0-14.0 μm band. If there is absorption to account for some of these observations, a reasonable explanation is that the 8.0-14.0 μm band of these data is considerably less transparent than the 9.0-11.4 μm band of the Port Hueneme data. Furthermore, part of it is due to CO_2 which is not humidity-dependent. In addition, the nights were very clear which would account for a rapid drop in ground temperature. The warmer, perhaps slightly humid, air could radiate at a warmer temperature and cause the 4.5-5.5 μm band temperature to show higher than that in the 8.0-14.0 μm band. Of course, the differences are small enough that experimental and calculational errors offer non-negligible contributions.

The above events are a good argument for representing the distributions in terms of temperature. Normalization of the Planck curve makes it easier to observe differences in the behavior of different thermal regions whether imaginary or real.

3. A. J. LaRocca, Statistical Analysis of Terrain and Water Backgrounds in the Vicinity of Port Hueneme, California, Report 132300-3-T, ERIM, April 1979.

3

SPECTRAL CORRELATIONS

The overall statistics of the various regions are given in Tables 2 through 5, where the means and standard deviations are recorded, as well as the correlations between the different spectral bands. The spectral bands are designated by channel number with the following correspondence:

Channel 2: 2.0-2.6 μm ($\mu W\text{-}cm^{-2}\text{-}sr^{-1}\text{-}\mu m^{-1}$)

Channel 4: 4.5-5.5 μm (°K)

Channel 5: 8.0-14.0 μm (°K)

The units for the means and standard deviations in the different spectral bands are given in parentheses.

In light of the statement made earlier (in Section 2) about radiance and temperature statistics, we felt sufficiently confident to compare the results of the 2.0-2.6 μm band with those of the thermal region. One must keep in mind, however, that different radiative mechanisms are in force owing to the sun's dominant influence in the short wavelength region.

TABLE 2

Camp A.P. Hill Area - Morning

Number of Subregions = 1

Pixel Subarea Divisions at: 1 855

Line Subarea Divisions at: 1 700

Line Increment Used = 1

Pixel Increment Used = 1

Correlation Channels: 2 (2.0 - 2.6 μm)
4 (4.5 - 5.5 μm)
5 (8.0 - 14.0 μm)

Correlation	2	4	5
2	1.000		
4	0.841	1.000	
5	0.760	0.905	1.000

Channels	2 ($\mu W\text{-}cm^{-2}\text{-}sr^{-1}\text{-}\mu m^{-1}$)	4 (°K)	4 (°K)
Mean	5.9364E+01	2.8377E+02	2.8344E+02
St. Dev.	2.7030E+01	2.5920E+00	2.3146E+00
Total Points	589260.	589260.	589260.

TABLE 3

Camp A.P. Hill Area - Afternoon

Number of Subregions = 1

Pixel Subarea Divisions at: 1 855

Line Subarea Divisions at: 1 704

Line Increment Used = 1

Pixel Increment Used = 1

Correlation Channels: 2 (2.0 - 2.6 μm)
4 (4.5 - 5.5 μm)
5 (8.0 - 14.0 μm)

Correlation	2	4	5
2	1.000		
4	0.782	1.000	
5	0.636	0.882	1.000

Channels	2 ($\mu W\text{-}cm^{-2}\text{-}sr^{-1}\text{-}\mu m^{-1}$)	4 (°K)	5 (°K)
Mean	6.2356E+01	2.8569E+02	2.8654E+02
St. Dev.	2.4785E+01	2.2922E+00	2.7390E+00
Total Points	597800.	597800.	597800.

TABLE 4

Camp A.P. Hill Area - Evening

Number of Subregions = 1

Pixel Subarea Divisions at: 344 855

Line Subarea Divisions at: 1 700

Line Increment Used = 1

Pixel Increment Used = 1

Correlation Channels: 4 (4.5 - 5.5 μm)
5 (8.0 - 14.0 μm)

Correlation	4	5
4	1.000	
5	0.767	1.000

Channels	4 (°K)	5 (°K)
Mean	2.8289E+02	2.8116E+02
St. Dev.	1.1683E+00	1.7043E+00
Total Pts.	357700.	357700.

TABLE 5

Camp A.P. Hill Area - Midnight

Number of Subregions = 1

Pixel Subarea Divisions at: 384 895

Line Subarea Divisions at: 1 1000

Line Increment Used = 1

Pixel Increment Used = 1

Correlation Channels: 4 (4.5 - 5.5 μm)
5 (8.0 - 14.0 μm)

Correlation	4	5
4	1.000	
5	0.669	1.000

Channels	4 (°K)	5 (°K)
Mean	2.8200E+02	2.7950E+02
St. Dev.	1.2626E+00	1.5362E+00
Total Pts.	504357.	504357.

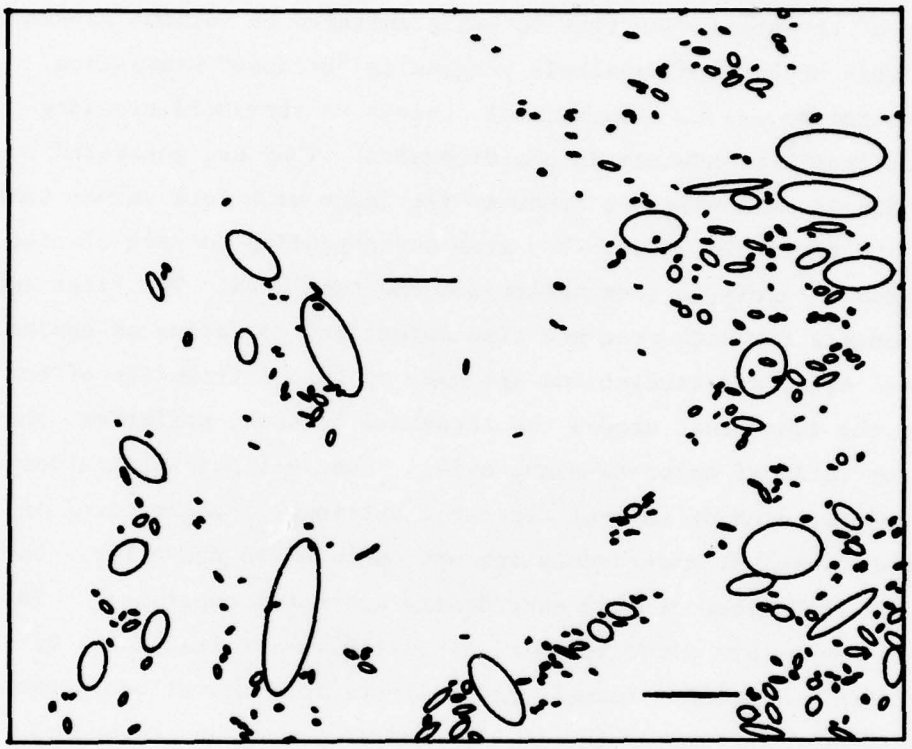
4
ELLIPSES

One of the statistics that is being gathered on various scenes as part of this backgrounds analysis program is "ellipse" statistics. These statistics are two-dimensional analogs of threshold crossing and pulse length statistics in one dimension. They are generated by identifying those contiguous areas in the image with data values that exceed some threshold value. The area corresponding to each cluster of contiguous pixels is then determined and tabulated. The first and second moments for each area are also determined to define an equivalent elliptical area, and tabulations are made of the distribution of contiguous areas in the image that exceed the threshold by area, perimeter, shape factor, or ratio of major-to-minor axis. These elliptic statistics are determined for each of several threshold settings. Single pixel and contiguous two-pixel exceedances are not included in the ellipse tabulations, but the number of such exceedances are noted separately. The threshold levels are given in units of multiples (or fractions) of one standard deviation. Examples of ellipses for the various scenes are illustrated in Figures 13, 14, 15, and 16. Certain features in the ellipses are clearly associated with comparable details in the imagery shown in Figures 2, 3, and 4, and the greymaps of Figures 5, 6, 7, and 8.

Tables 6 through 9 show how the contiguous areas that exceed several thresholds are distributed by area (square meters), perimeter (meters), and shape factor. The shape factor is defined to be the ratio of the perimeter/2π and the square root of the area/π , i.e.,

$$\text{shape factor} = \frac{\text{perimeter}/2\pi}{(\text{area}/\pi)^{1/2}}$$

For a circular area, the shape factor would achieve its minimum value of unity.



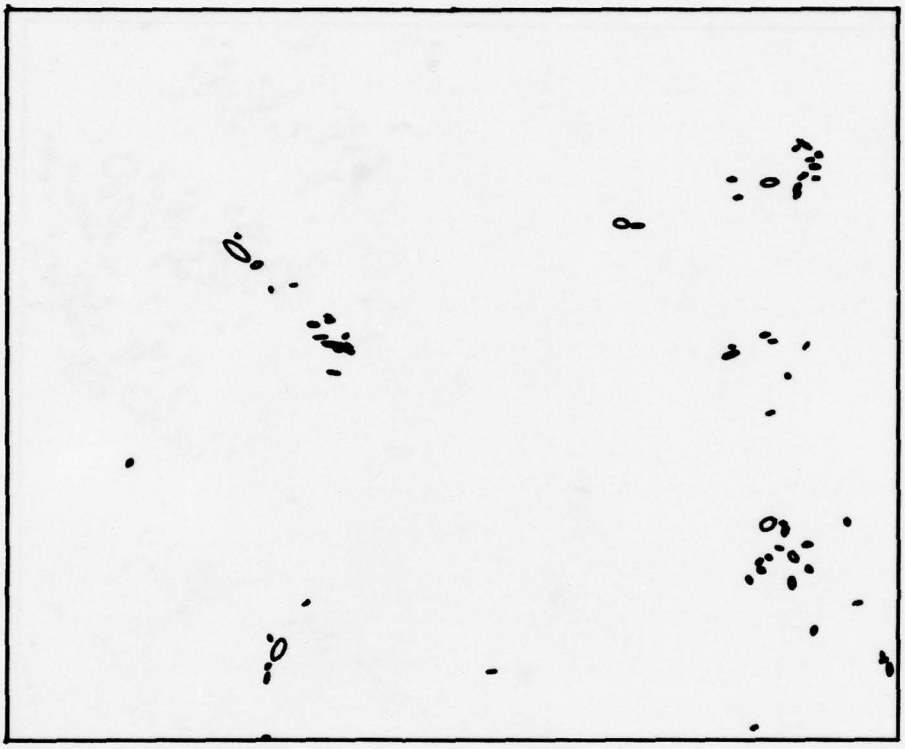
Area: Camp A.P. Hill - Morning

Radiance Threshold

= Ave. + 1.50 σ

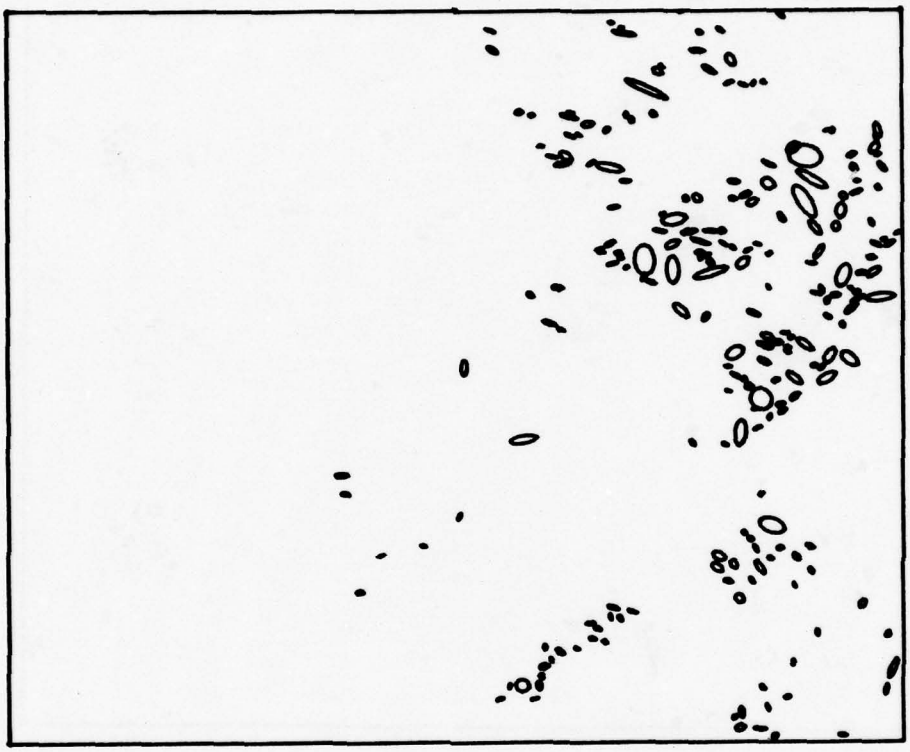
Wavelength = 2.0 - 2.6 μm

FIGURE 13a. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Morning
Radiance Threshold
= Ave. + 2.50 σ
Wavelength = 2.0 - 2.6 μm

FIGURE 13b. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

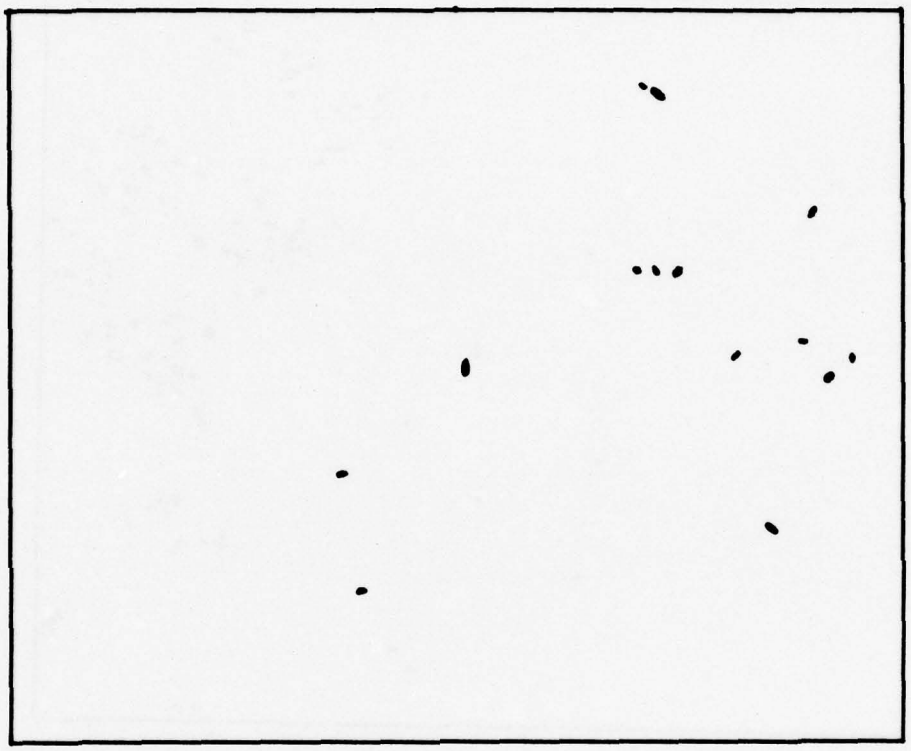


Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 2.50 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 13c. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 3.00 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 13d. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 3.50 σ
Wavelength = 4.5 - 5.5 μm

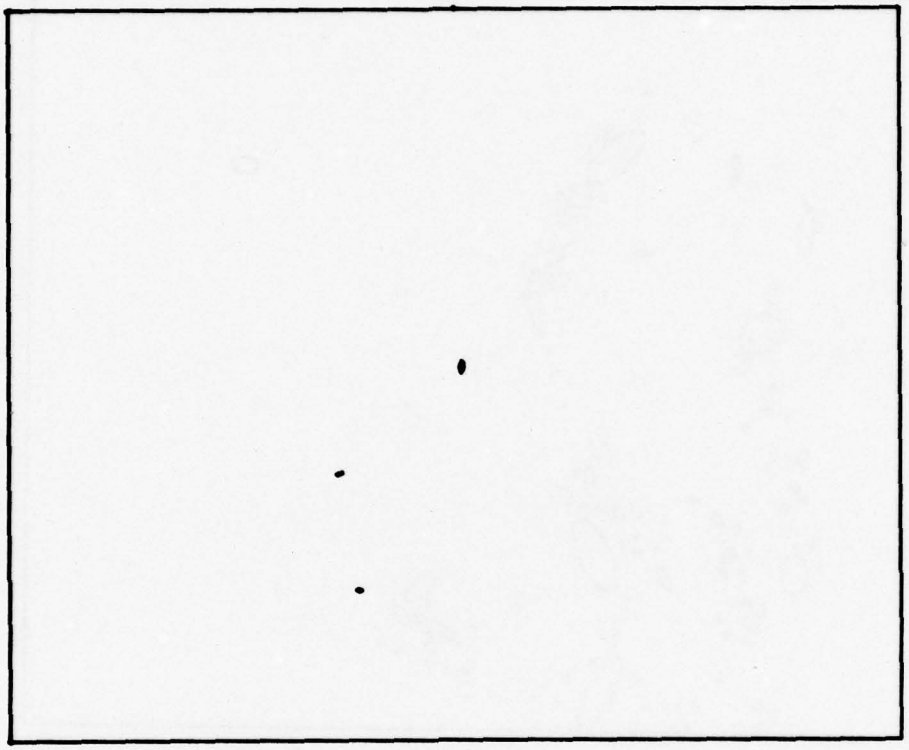
FIGURE 13e. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 2.50 σ
Wavelength = 8.0 - 14.0 μm

FIGURE 13f. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

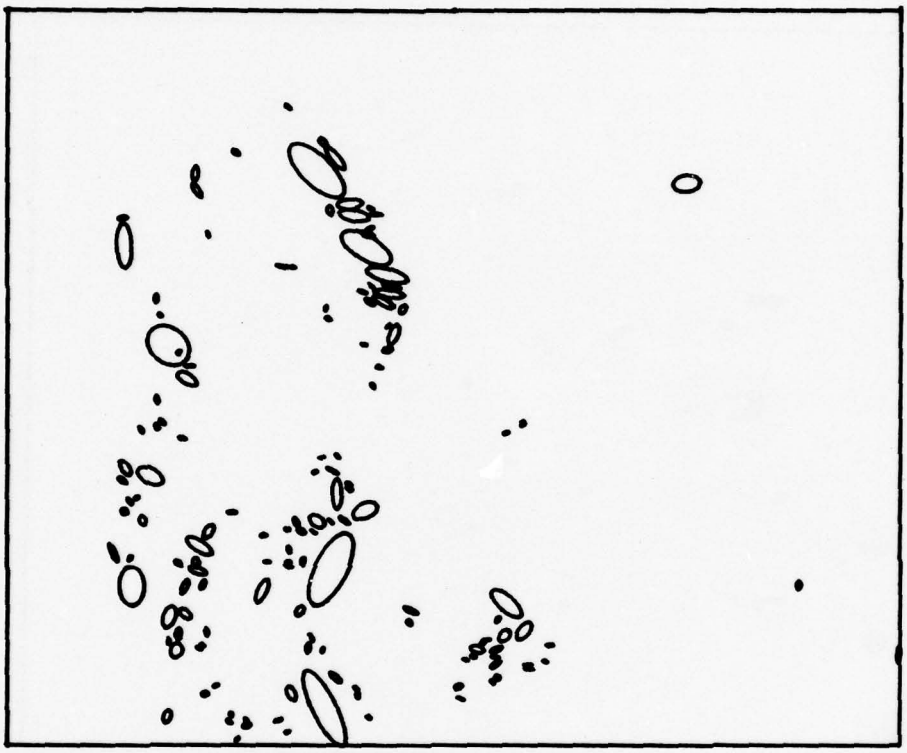
Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 3.00 σ
Wavelength = 8.0 -14.0 μm

FIGURE 13g. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



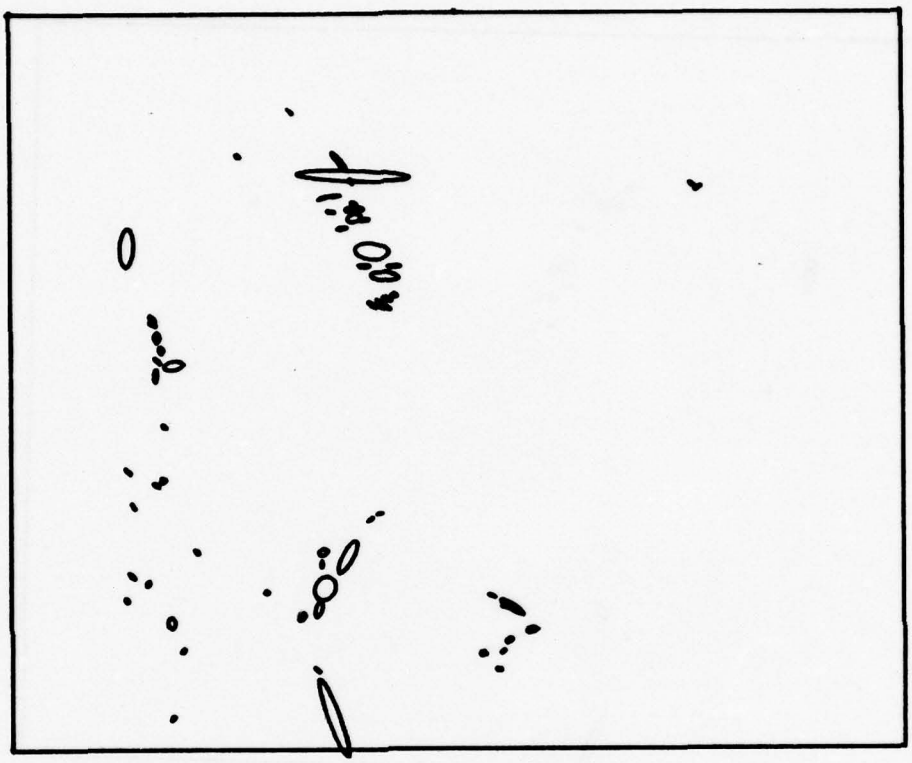
Area: Camp A.P. Hill - Morning
Temperature Threshold
= Ave. + 4.00 σ
Wavelength = 8.0 -14.0 μm

FIGURE 13h. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Afternoon
Radiance Threshold
= Ave. + 2.00 σ
Wavelength = 2.0 - 2.6 μm

FIGURE 14a. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

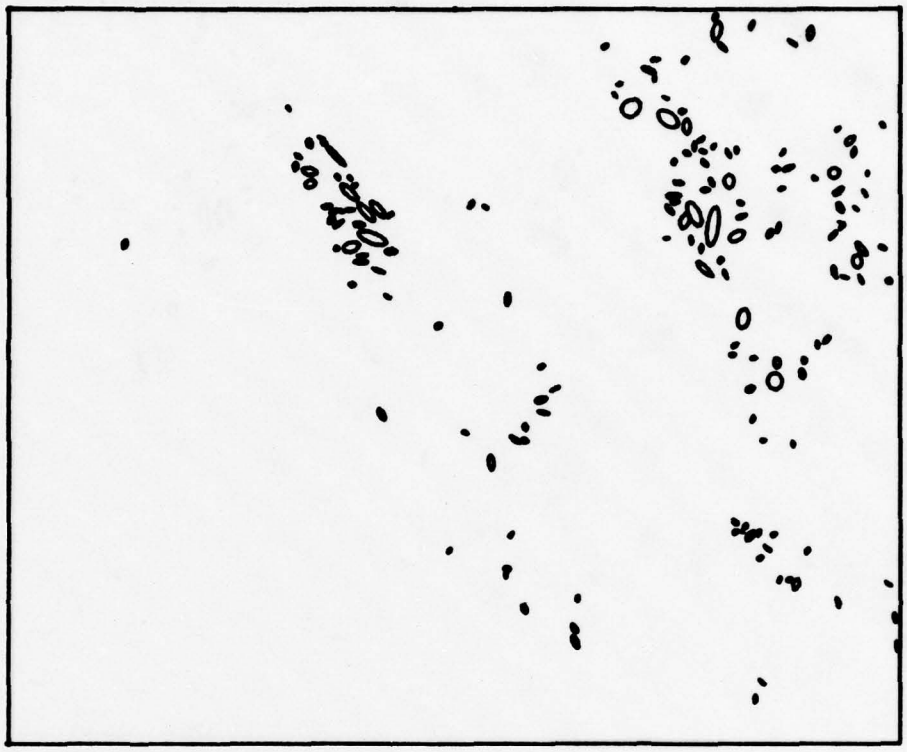


Area: Camp A.P. Hill - Afternoon
Radiance Threshold
= Ave. + 2.50 σ
Wavelength = 2.0 - 2.6 μm

FIGURE 14b. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

Area: Camp A.P. Hill - Afternoon
Radiance Threshold
= Ave. + 3.00 σ
Wavelength = 2.0 - 2.6 μm

FIGURE 14c. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



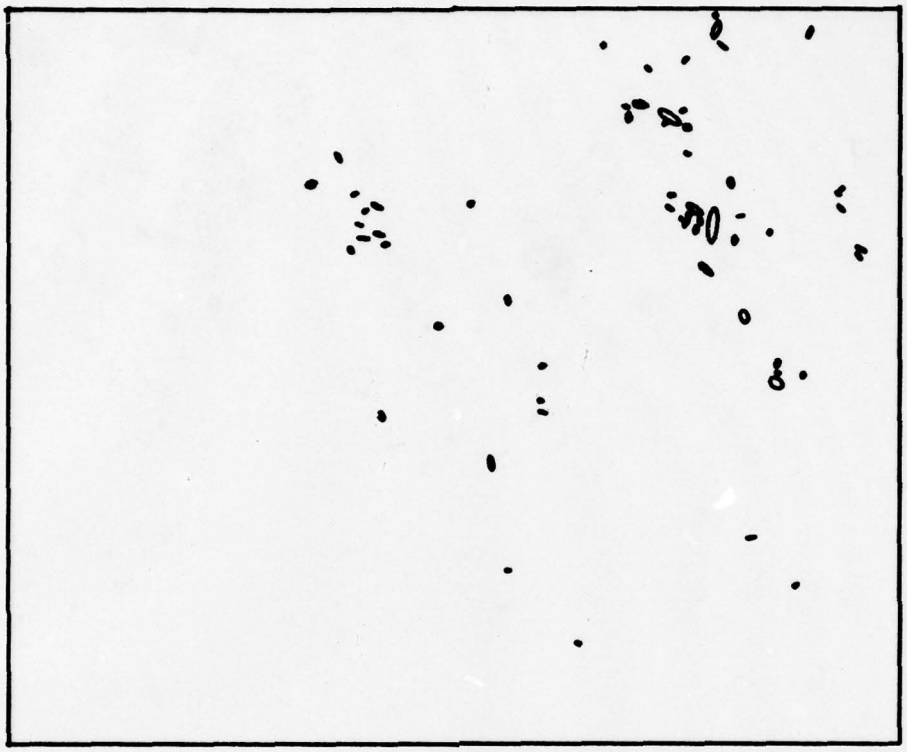
Area: Camp A.P. Hill - Afternoon

Temperature Threshold

= Ave. + 2.50 σ

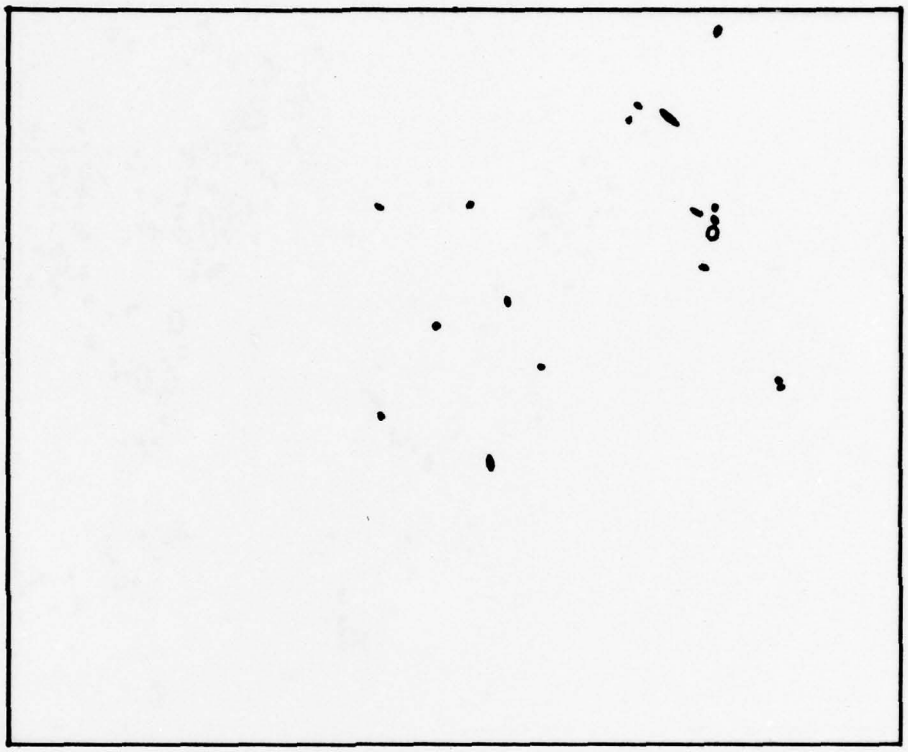
Wavelength = 4.5 - 5.5 μm

FIGURE 14d. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



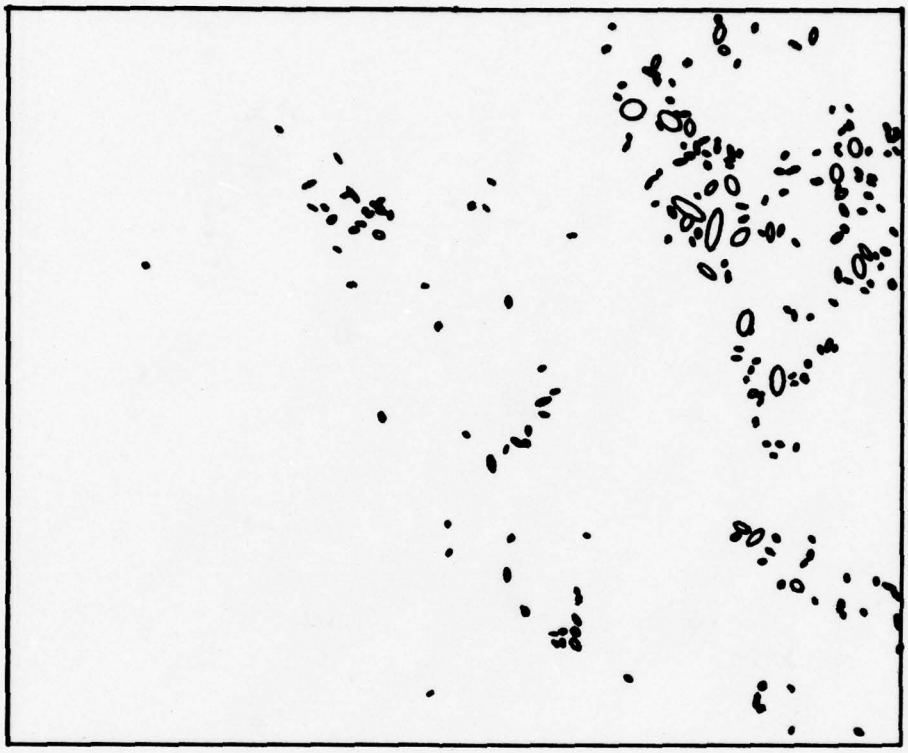
Area: Camp A.P. Hill - Afternoon
Temperature Threshold
= Ave. + 3.00 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 14e. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



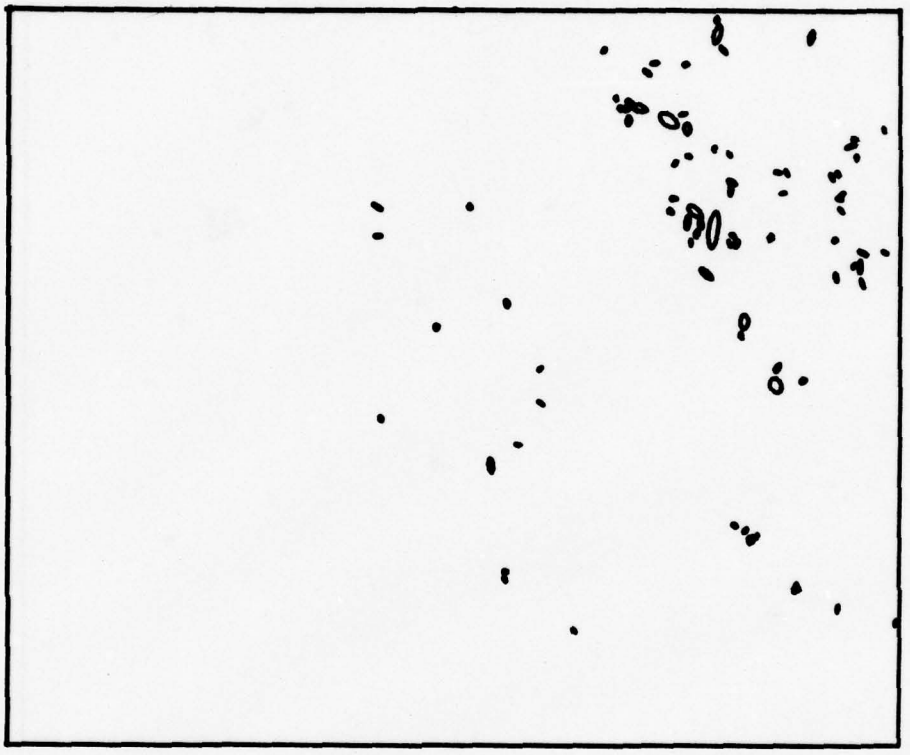
Area: Camp A.P. Hill - Afternoon
Temperature Threshold
= Ave. + 3.50 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 14f. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



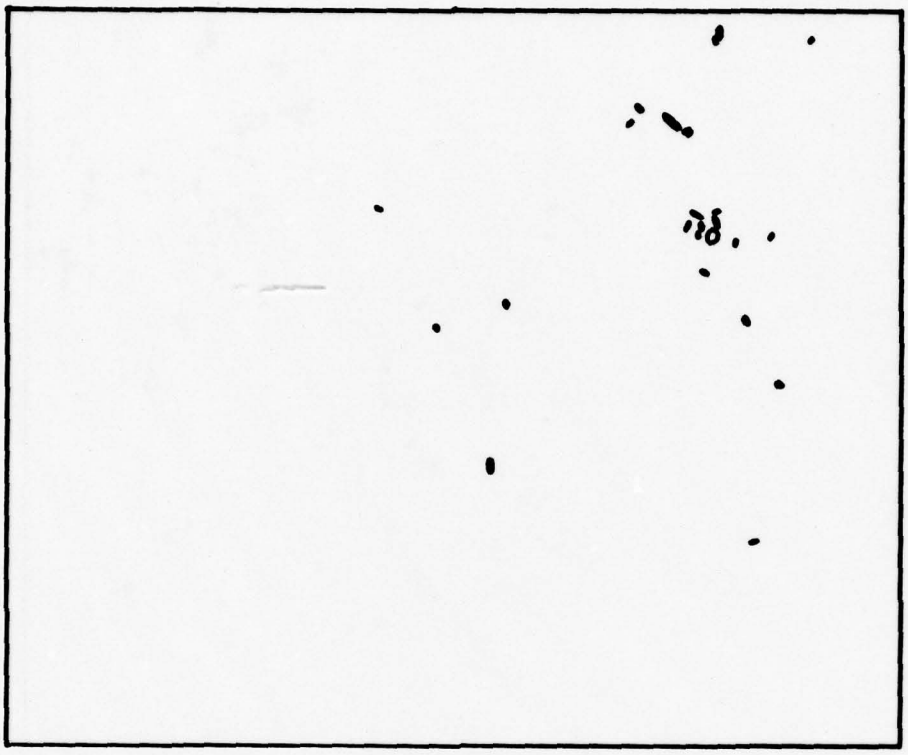
Area: Camp A.P. Hill - Afternoon
Temperature Threshold
= Ave. + 2.50 σ
Wavelength = 8.0 - 14.0 μm

FIGURE 14g. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Afternoon
Temperature Threshold
= Ave. + 3.00 σ
Wavelength = 8.0 - 14.0 μm

FIGURE 14h. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



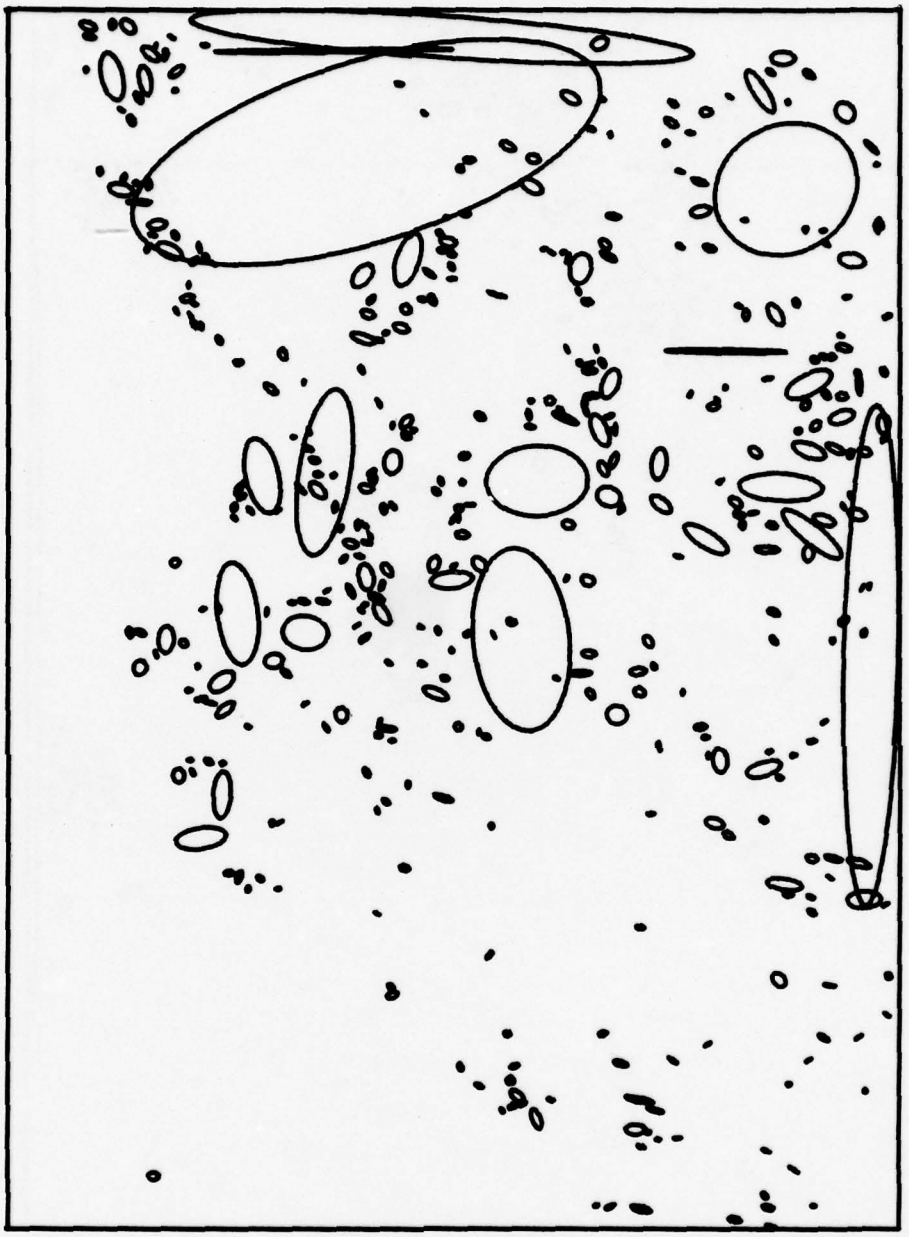
Area: Camp A.P. Hill - Afternoon

Temperature Threshold

= Ave. + 3.50 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 14i. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

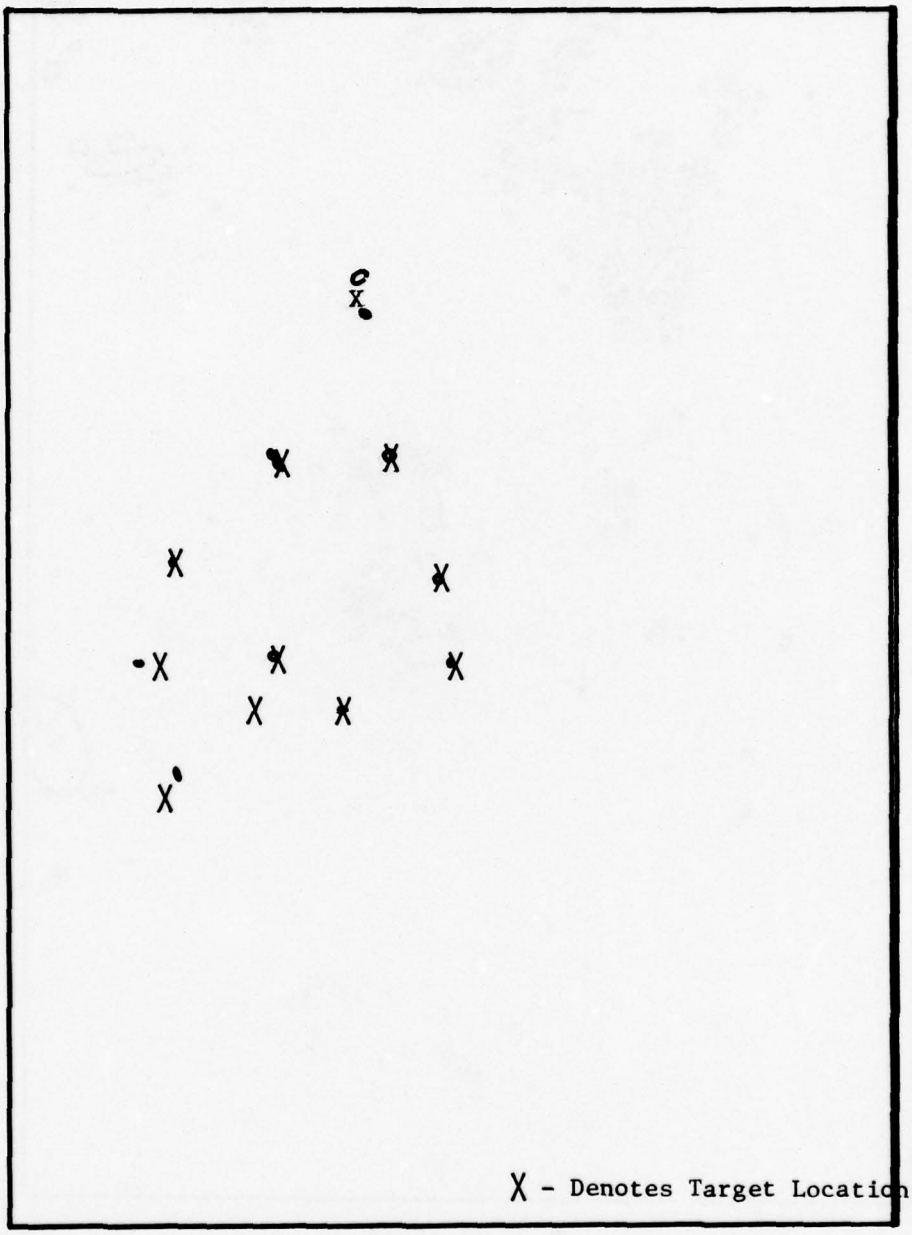


Area: Camp A.P. Hill - Evening
Temperature Threshold
= Ave. + 1.00 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 15a. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

Area: Camp A.P. Hill - Evening
Temperature Threshold
= Ave. + 2.00 σ
Wavelength = 4.5 - 5.5 μm

FIGURE 15b. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



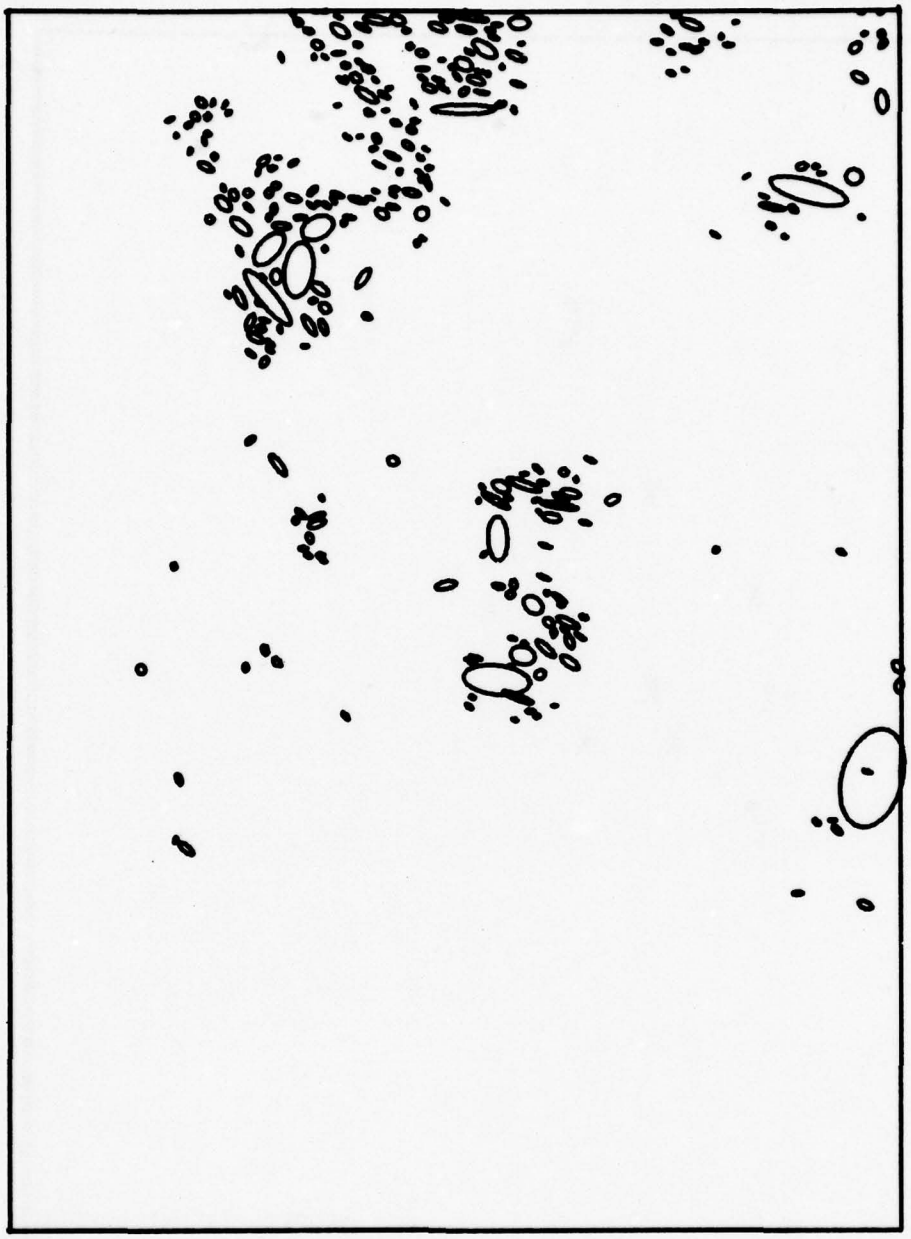
Area: Camp A.P. Hill - Evening

Temperature Threshold

= Ave. + 3.00 σ

Wavelength = 4.5 - 5.5 μm

FIGURE 15c. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



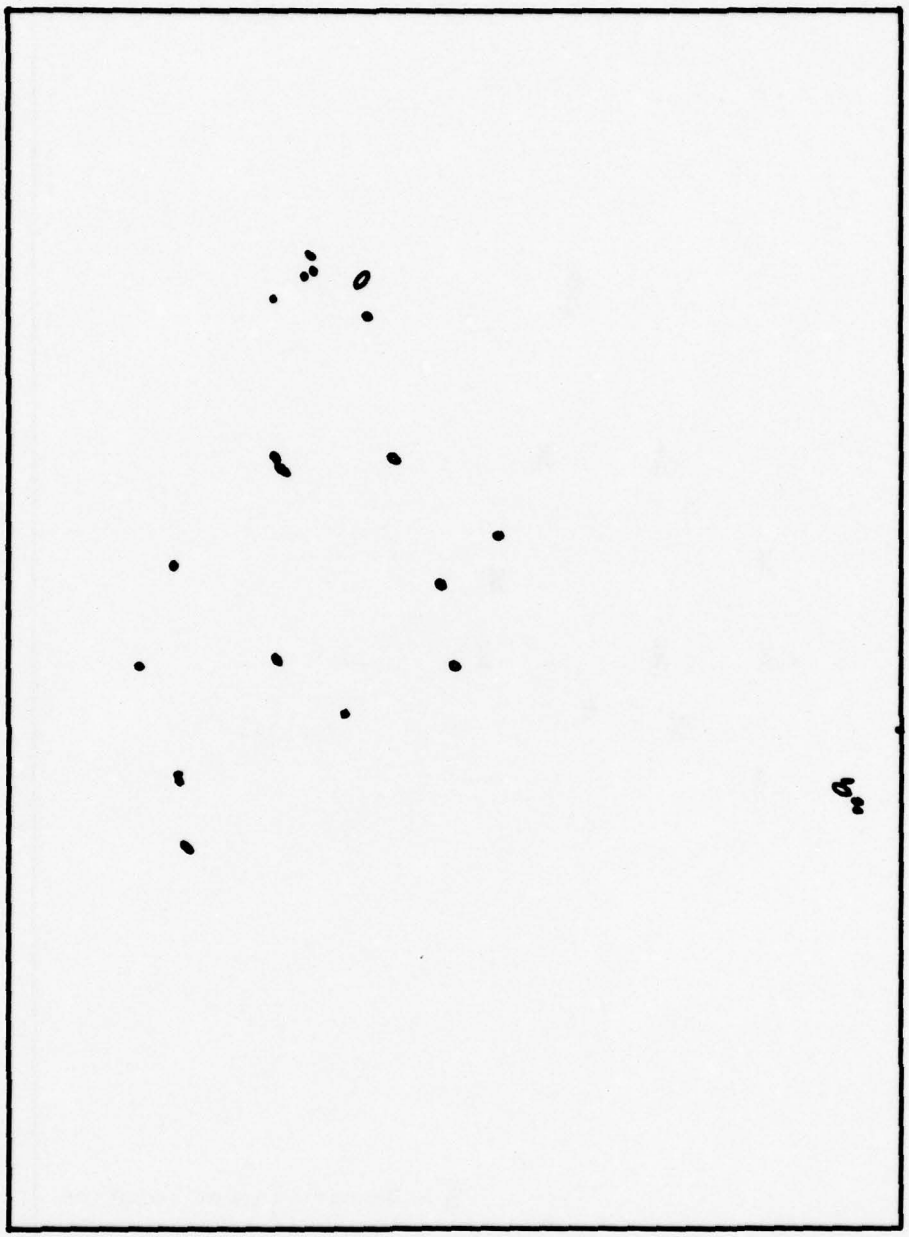
Area: Camp A.P. Hill - Evening

Temperature Threshold

= Ave. + 2.00 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 15d. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



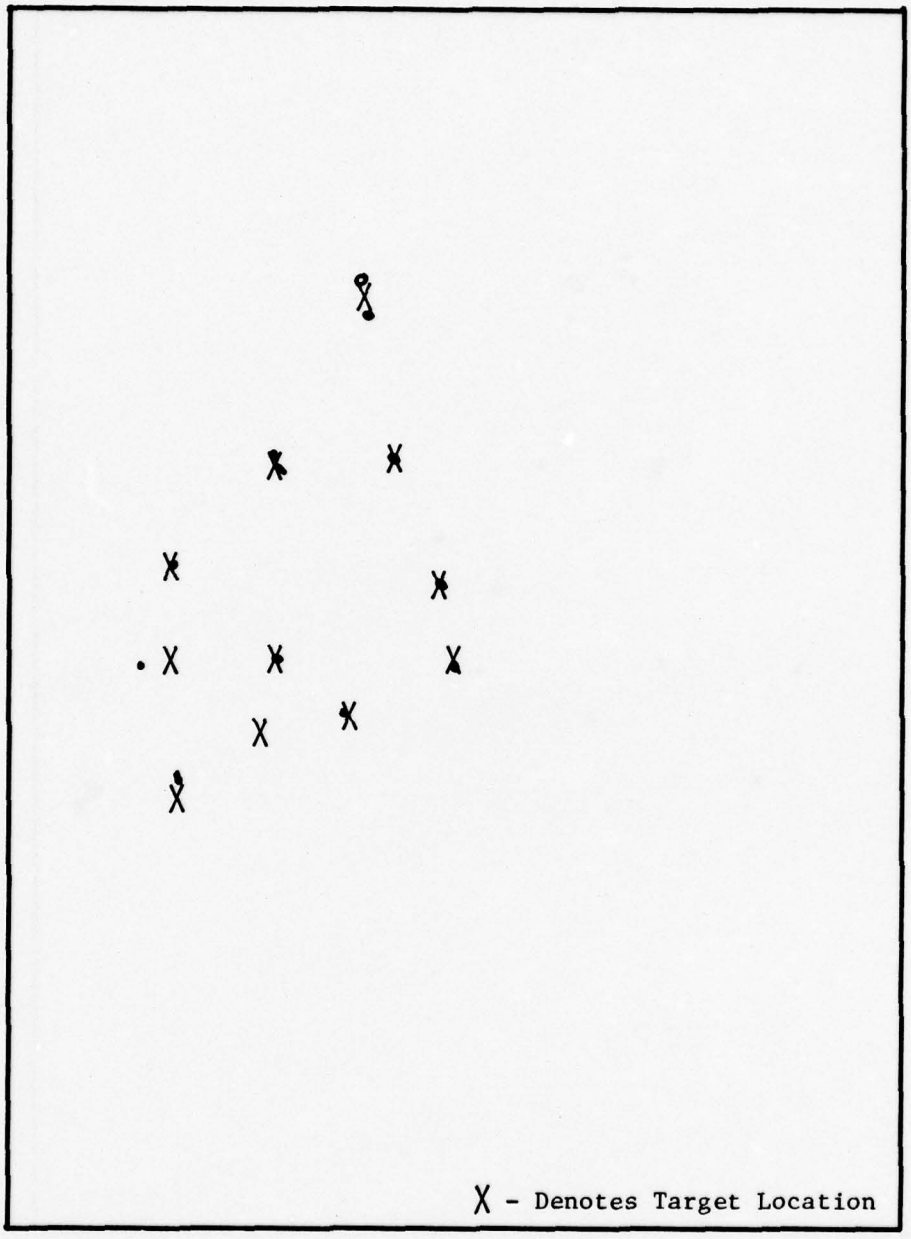
Area: Camp A.P. Hill - Evening

Temperature Threshold

= Ave. + 2.50 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 15e. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



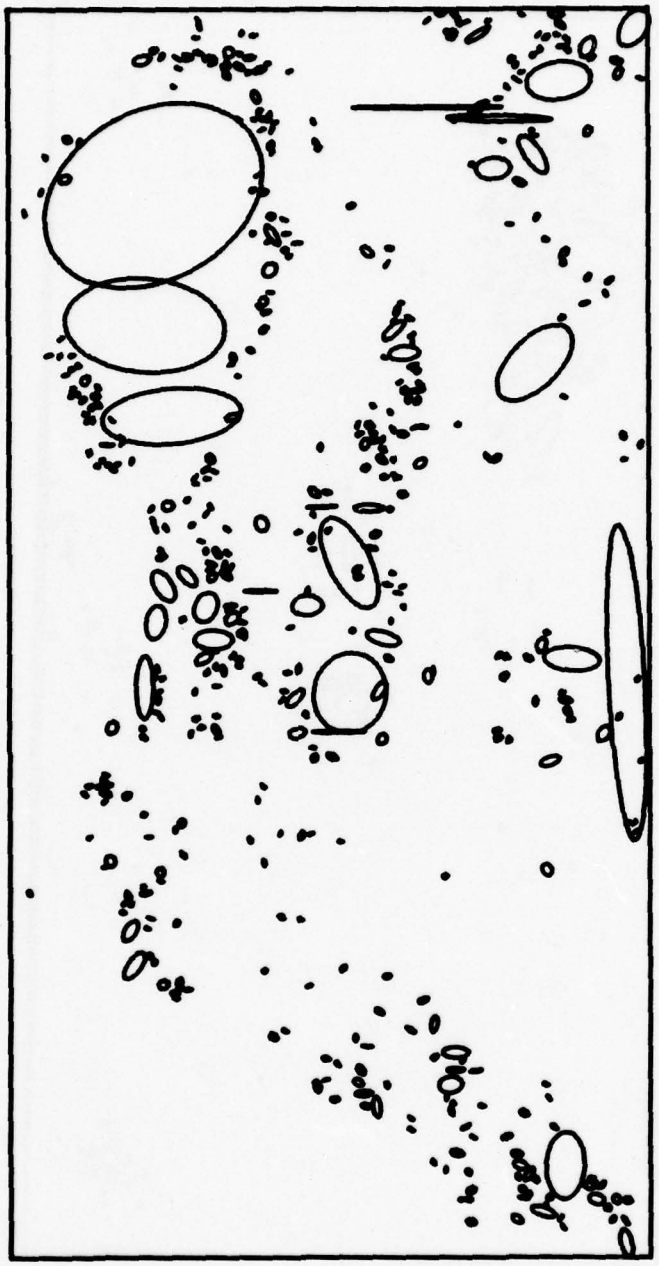
Area: Camp A.P. Hill - Evening

Temperature Threshold

= Ave. + 3.00 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 15f. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 1.00 σ

Wavelength = 4.5 - 5.5 μm

FIGURE 16a. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

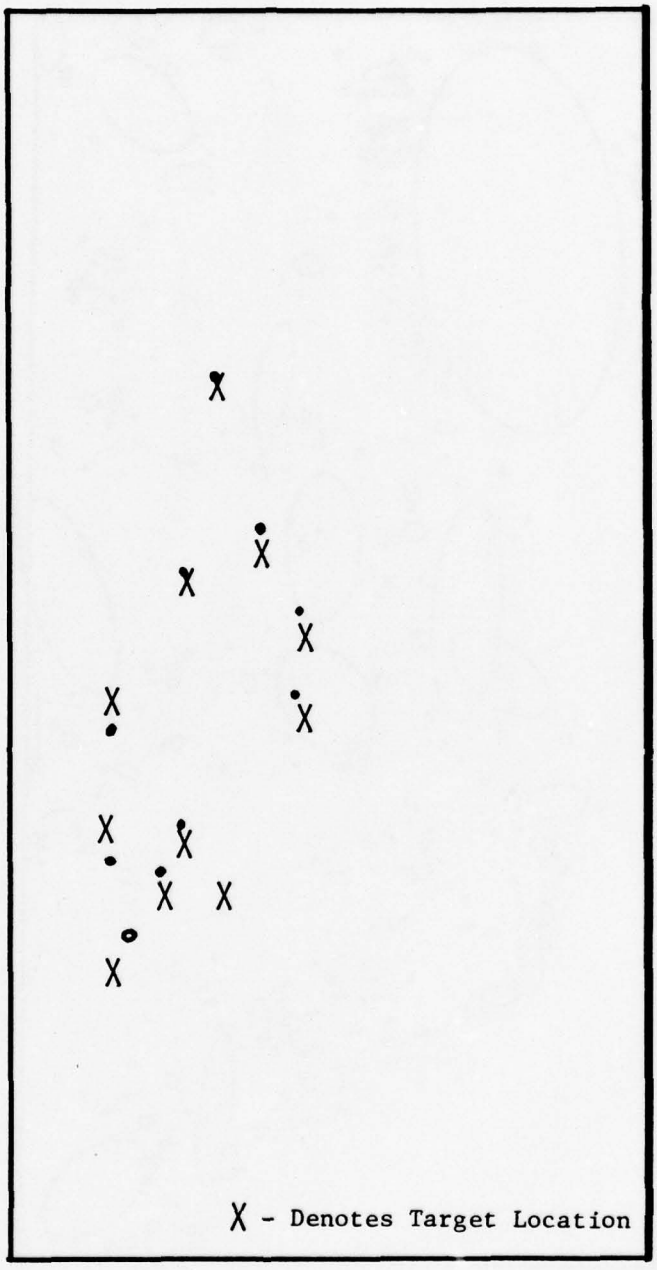
Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 1.50 σ

Wavelength = 4.5 - 5.5 μm

FIGURE 16b. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



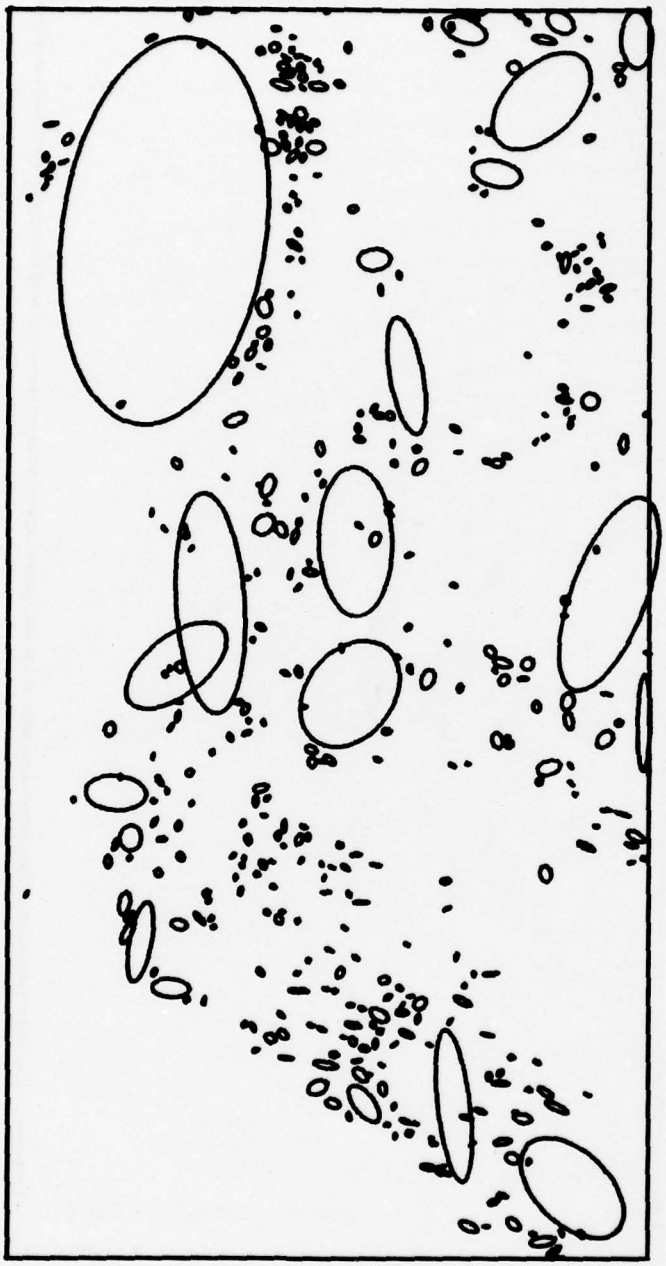
Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 2.50 σ

Wavelength = 4.5 - 5.5 μm

FIGURE 16c. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



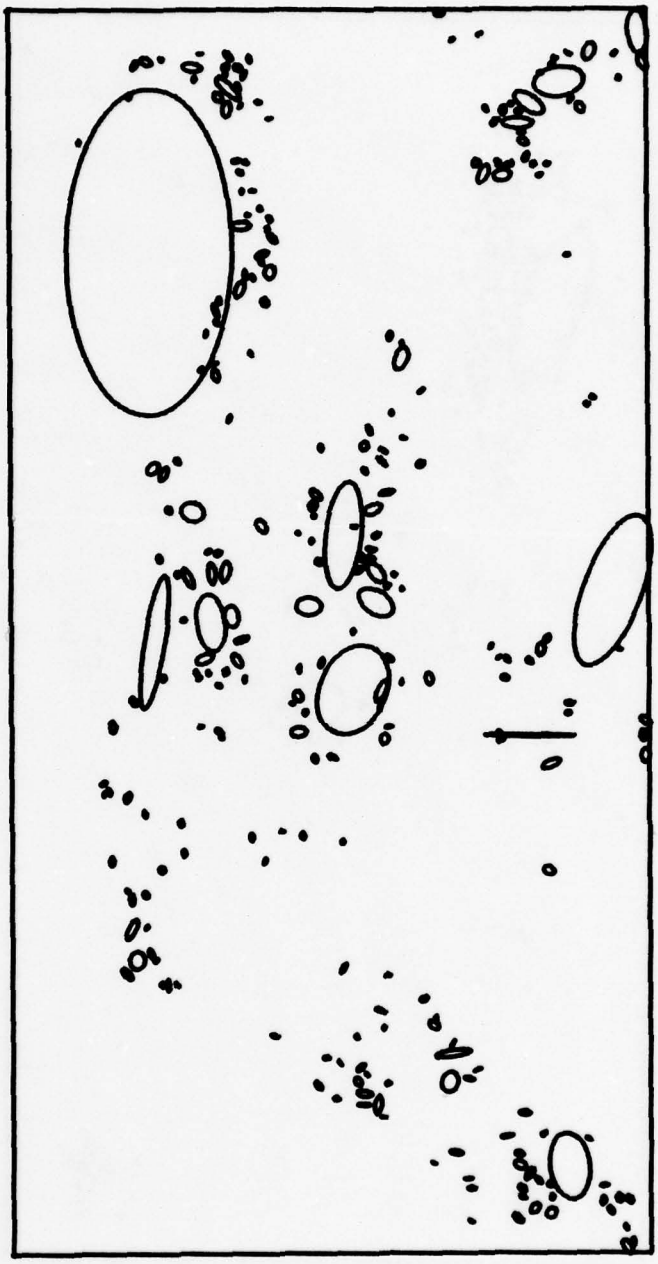
Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 1.00 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 16d. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



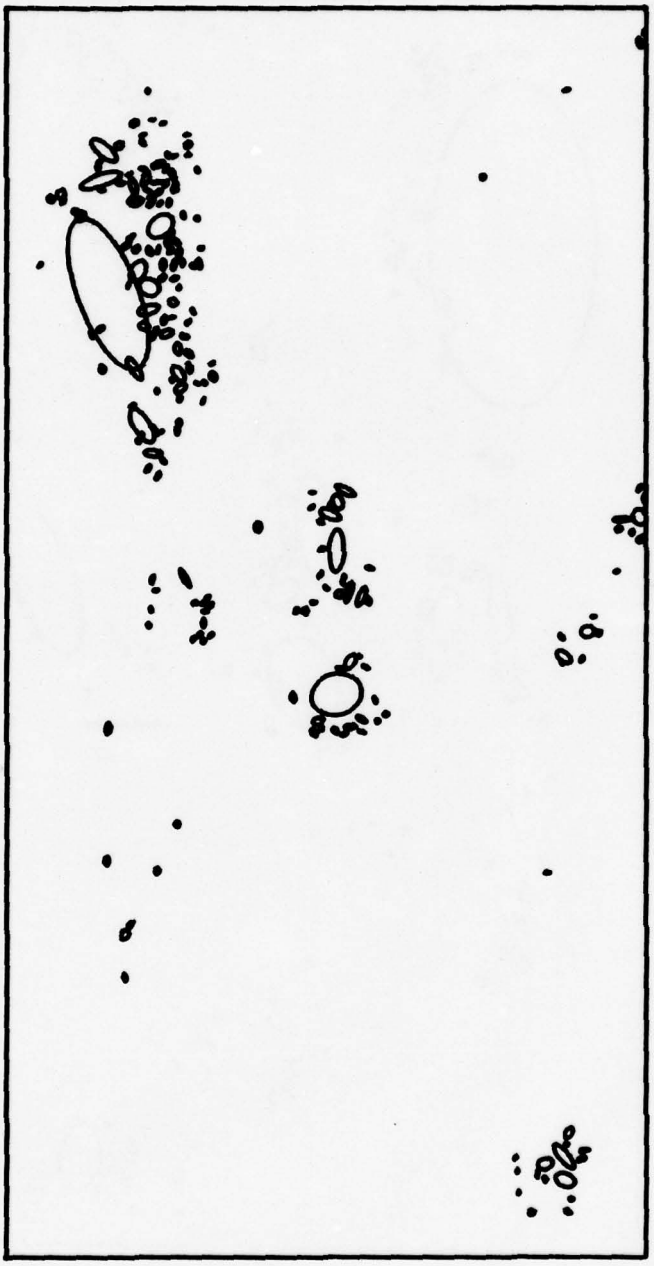
Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 1.50 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 16e. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



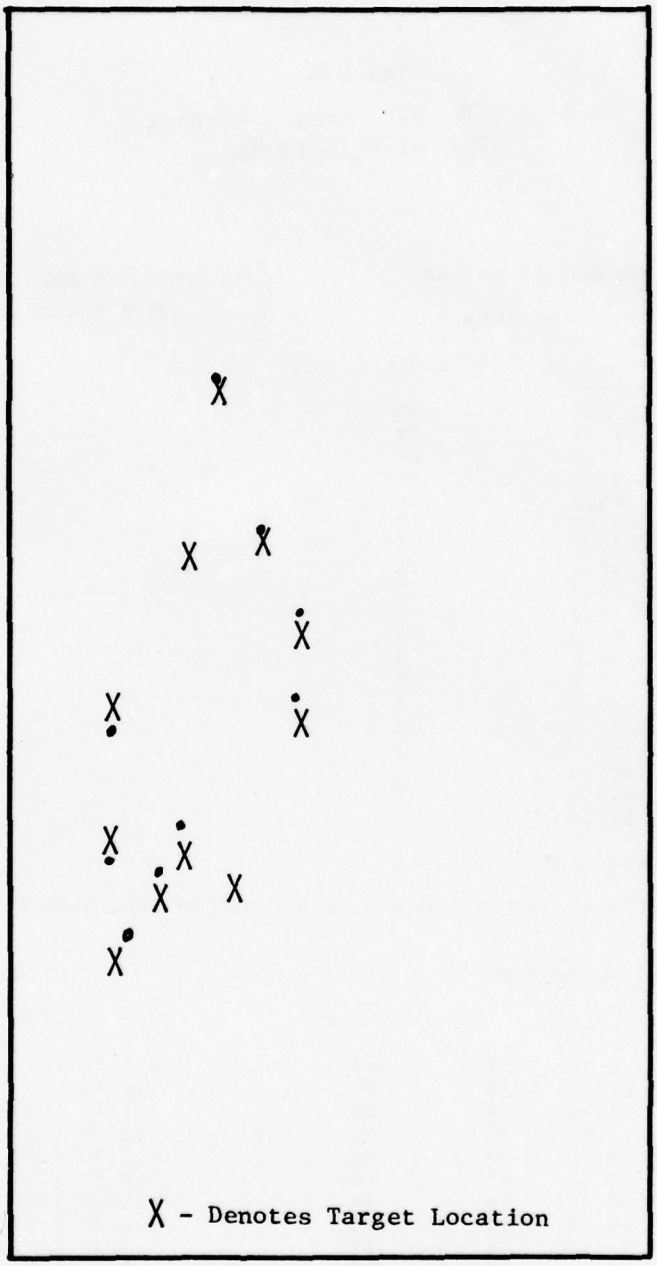
Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 2.00 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 16f. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL



Area: Camp A.P. Hill - Midnight

Temperature Threshold

= Ave. + 3.00 σ

Wavelength = 8.0 - 14.0 μm

FIGURE 16g. EQUIVALENT ELLIPTICAL AREAS FOR CAMP A.P. HILL

TABLE 6

Camp A.P. Hill Area - Morning
AREA DISTRIBUTIONS

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 1.5 σ
2.0 - 2.6 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	485
5.0	TO	10.0	75
10.0	TO	15.0	24
15.0	TO	20.0	19
20.0	TO	25.0	14
25.0	TO	30.0	2
30.0	TO	35.0	9
35.0	TO	40.0	3
40.0	TO	45.0	5
45.0	TO	50.0	3
50.0	TO	75.0	4
75.0	TO	100.0	4
100.0	TO	150.0	3
150.0	TO	200.0	2
200.0	TO	250.0	3
250.0	TO	300.0	1
300.0	TO	400.0	2
400.0	TO	500.0	3
OVER		500.0	5

TOTAL NUMBER OF HOT SPOT = 666

925 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	302
7	TO	10	22	TO	32	96
10	TO	12	32	TO	39	42
12	TO	14	39	TO	45	31
14	TO	16	45	TO	52	22
16	TO	17	52	TO	55	6
17	TO	20	55	TO	65	24
20	TO	22	65	TO	72	13
22	TO	24	72	TO	78	15
24	TO	26	78	TO	85	7
26	TO	28	85	TO	91	7
28	TO	30	91	TO	98	8
30	TO	32	98	TO	104	14
32	TO	39	104	TO	127	9
39	TO	45	127	TO	147	11
45	TO	55	147	TO	180	12
55	TO	71	180	TO	232	14
71	TO	100	232	TO	328	8
OVER		100	OVER		328	25

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	19
1.2	TO	1.3	17
1.3	TO	1.4	108
1.4	TO	1.5	54
1.5	TO	1.6	69
1.6	TO	1.7	93
1.7	TO	1.8	48
1.8	TO	1.9	39
1.9	TO	2.0	30
2.0	TO	2.4	79
2.4	TO	2.6	30
2.6	TO	2.8	15
2.8	TO	3.0	16
3.0	TO	3.5	16
3.5	TO	4.0	13
4.0	TO	4.5	3
OVER		4.5	17

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 3.5 σ
2.0 - 2.6 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	1
5.0 TO	10.0	0
10.0 TO	15.0	0
15.0 TO	20.0	0
20.0 TO	25.0	0
25.0 TO	30.0	0
30.0 TO	35.0	0
35.0 TO	40.0	0
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	0
75.0 TO	100.0	0
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 1

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	0
7 TO	10	22 TO	32	0
10 TO	12	32 TO	39	0
12 TO	14	39 TO	45	0
14 TO	16	45 TO	52	1
16 TO	17	52 TO	55	0
17 TO	20	55 TO	65	0
20 TO	22	65 TO	72	0
22 TO	24	72 TO	78	0
24 TO	26	78 TO	85	0
26 TO	28	85 TO	91	0
28 TO	30	91 TO	98	0
30 TO	32	98 TO	104	0
32 TO	39	104 TO	127	0
39 TO	45	127 TO	147	0
45 TO	55	147 TO	180	0
55 TO	71	180 TO	232	0
71 TO	100	232 TO	328	0
OVER	100	OVER	328	0

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	0
1.2 TO	1.3	0
1.3 TO	1.4	0
1.4 TO	1.5	0
1.5 TO	1.6	0
1.6 TO	1.7	0
1.7 TO	1.8	0
1.8 TO	1.9	1
1.9 TO	2.0	0
2.0 TO	2.4	0
2.4 TO	2.6	0
2.6 TO	2.8	0
2.8 TO	3.0	0
3.0 TO	3.5	0
3.5 TO	4.0	0
4.0 TO	4.5	0
OVER	4.5	0

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	267
5.0 TO	10.0	50
10.0 TO	15.0	18
15.0 TO	20.0	10
20.0 TO	25.0	7
25.0 TO	30.0	3
30.0 TO	35.0	2
35.0 TO	40.0	3
40.0 TO	45.0	2
45.0 TO	50.0	3
50.0 TO	75.0	3
75.0 TO	100.0	2
100.0 TO	150.0	2
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 372

205 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	165
7 TO	10	22 TO	32	50
10 TO	12	32 TO	39	28
12 TO	14	39 TO	45	27
14 TO	16	45 TO	52	9
16 TO	17	52 TO	55	6
17 TO	20	55 TO	65	23
20 TO	22	65 TO	72	6
22 TO	24	72 TO	78	5
24 TO	26	78 TO	85	8
26 TO	28	85 TO	91	6
28 TO	30	91 TO	98	2
30 TO	32	98 TO	104	2
32 TO	39	104 TO	127	8
39 TO	45	127 TO	147	9
45 TO	55	147 TO	180	2
55 TO	71	180 TO	232	4
71 TO	100	232 TO	328	6
OVER	100	OVER	328	6

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	17
1.2 TO	1.3	17
1.3 TO	1.4	80
1.4 TO	1.5	49
1.5 TO	1.6	27
1.6 TO	1.7	39
1.7 TO	1.8	31
1.8 TO	1.9	24
1.9 TO	2.0	19
2.0 TO	2.4	36
2.4 TO	2.6	9
2.6 TO	2.8	5
2.8 TO	3.0	5
3.0 TO	3.5	8
3.5 TO	4.0	3
4.0 TO	4.5	2
OVER	4.5	1

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 3.0 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	174
5.0 TO	10.0	22
10.0 TO	15.0	8
15.0 TO	20.0	3
20.0 TO	25.0	2
25.0 TO	30.0	2
30.0 TO	35.0	0
35.0 TO	40.0	0
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	0
75.0 TO	100.0	0
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 211

131 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	101
7 TO	10	22 TO	32	44
10 TO	12	32 TO	39	14
12 TO	14	39 TO	45	8
14 TO	16	45 TO	52	11
16 TO	17	52 TO	55	1
17 TO	20	55 TO	65	10
20 TO	22	65 TO	72	6
22 TO	24	72 TO	78	4
24 TO	26	78 TO	85	0
26 TO	28	85 TO	91	2
28 TO	30	91 TO	98	3
30 TO	32	98 TO	104	2
32 TO	39	104 TO	127	3
39 TO	45	127 TO	147	1
45 TO	55	147 TO	180	1
55 TO	71	180 TO	232	0
71 TO	100	232 TO	328	0
OVER	100	OVER	328	0

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	9
1.2 TO	1.3	8
1.3 TO	1.4	42
1.4 TO	1.5	28
1.5 TO	1.6	24
1.6 TO	1.7	29
1.7 TO	1.8	18
1.8 TO	1.9	17
1.9 TO	2.0	11
2.0 TO	2.4	21
2.4 TO	2.6	3
2.6 TO	2.8	0
2.8 TO	3.0	0
3.0 TO	3.5	1
3.5 TO	4.0	0
4.0 TO	4.5	0
OVER	4.5	0

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	42
5.0	TO	10.0	4
10.0	TO	15.0	2
15.0	TO	20.0	0
20.0	TO	25.0	0
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 48

58 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	36
7	TO	10	22	TO	32	3
10	TO	12	32	TO	39	1
12	TO	14	39	TO	45	1
14	TO	16	45	TO	52	2
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	3
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	2
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	3
1.2	TO	1.3	4
1.3	TO	1.4	18
1.4	TO	1.5	6
1.5	TO	1.6	4
1.6	TO	1.7	4
1.7	TO	1.8	4
1.8	TO	1.9	0
1.9	TO	2.0	1
2.0	TO	2.4	3
2.4	TO	2.6	1
2.6	TO	2.8	0
2.8	TO	3.0	0
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 2.5 σ
8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	319
5.0	TO	10.0	59
10.0	TO	15.0	15
15.0	TO	20.0	14
20.0	TO	25.0	5
25.0	TO	30.0	3
30.0	TO	35.0	4
35.0	TO	40.0	0
40.0	TO	45.0	2
45.0	TO	50.0	1
50.0	TO	75.0	4
75.0	TO	100.0	2
100.0	TO	150.0	1
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 429

311 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	198
7	TO	10	22	TO	32	56
10	TO	12	32	TO	39	29
12	TO	14	39	TO	45	30
14	TO	16	45	TO	52	18
16	TO	17	52	TO	55	5
17	TO	20	55	TO	65	15
20	TO	22	65	TO	72	15
22	TO	24	72	TO	78	7
24	TO	26	78	TO	85	6
26	TO	28	85	TO	91	5
28	TO	30	91	TO	98	6
30	TO	32	98	TO	104	4
32	TO	39	104	TO	127	10
39	TO	45	127	TO	147	5
45	TO	55	147	TO	180	2
55	TO	71	180	TO	232	6
71	TO	100	232	TO	328	8
OVER		100	OVER		328	4

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	18
1.2	TO	1.3	35
1.3	TO	1.4	76
1.4	TO	1.5	54
1.5	TO	1.6	29
1.6	TO	1.7	47
1.7	TO	1.8	27
1.8	TO	1.9	23
1.9	TO	2.0	20
2.0	TO	2.4	55
2.4	TO	2.6	15
2.6	TO	2.8	8
2.8	TO	3.0	6
3.0	TO	3.5	4
3.5	TO	4.0	6
4.0	TO	4.5	5
OVER		4.5	1

TABLE 6 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	214
5.0	TO	10.0	15
10.0	TO	15.0	4
15.0	TO	20.0	4
20.0	TO	25.0	0
25.0	TO	30.0	1
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 238

229 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	141
7	TO	10	22	TO	32	43
10	TO	12	32	TO	39	12
12	TO	14	39	TO	45	11
14	TO	16	45	TO	52	5
16	TO	17	52	TO	55	4
17	TO	20	55	TO	65	6
20	TO	22	65	TO	72	4
22	TO	24	72	TO	78	1
24	TO	26	78	TO	85	3
26	TO	28	85	TO	91	1
28	TO	30	91	TO	98	1
30	TO	32	98	TO	104	2
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	2
45	TO	55	147	TO	180	2
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	10
1.2	TO	1.3	26
1.3	TO	1.4	58
1.4	TO	1.5	36
1.5	TO	1.6	20
1.6	TO	1.7	31
1.7	TO	1.8	15
1.8	TO	1.9	8
1.9	TO	2.0	9
2.0	TO	2.4	15
2.4	TO	2.6	6
2.6	TO	2.8	1
2.8	TO	3.0	2
3.0	TO	3.5	1
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 6 (Concluded)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 4.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	6
5.0 TO	10.0	1
10.0 TO	15.0	0
15.0 TO	20.0	0
20.0 TO	25.0	0
25.0 TO	30.0	0
30.0 TO	35.0	0
35.0 TO	40.0	0
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	0
75.0 TO	100.0	0
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 7

6 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	5
7 TO	10	22 TO	32	1
10 TO	12	32 TO	39	0
12 TO	14	39 TO	45	0
14 TO	16	45 TO	52	0
16 TO	17	52 TO	55	1
17 TO	20	55 TO	65	0
20 TO	22	65 TO	72	0
22 TO	24	72 TO	78	0
24 TO	26	78 TO	85	0
26 TO	28	85 TO	91	0
28 TO	30	91 TO	98	0
30 TO	32	98 TO	104	0
32 TO	39	104 TO	127	0
39 TO	45	127 TO	147	0
45 TO	55	147 TO	180	0
55 TO	71	180 TO	232	0
71 TO	100	232 TO	328	0
OVER	100	OVER	328	0

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	1
1.2 TO	1.3	0
1.3 TO	1.4	3
1.4 TO	1.5	0
1.5 TO	1.6	1
1.6 TO	1.7	1
1.7 TO	1.8	1
1.8 TO	1.9	0
1.9 TO	2.0	0
2.0 TO	2.4	0
2.4 TO	2.6	0
2.6 TO	2.8	0
2.8 TO	3.0	0
3.0 TO	3.5	0
3.5 TO	4.0	0
4.0 TO	4.5	0
OVER	4.5	0

TABLE 7

Camp A.P. Hill Area - Afternoon
AREA DISTRIBUTIONS

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 2.0 σ
2.0 - 2.6 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	237
5.0	TO	10.0	25
10.0	TO	15.0	9
15.0	TO	20.0	7
20.0	TO	25.0	4
25.0	TO	30.0	2
30.0	TO	35.0	2
35.0	TO	40.0	4
40.0	TO	45.0	2
45.0	TO	50.0	1
50.0	TO	75.0	5
75.0	TO	100.0	2
100.0	TO	150.0	2
150.0	TO	200.0	1
200.0	TO	250.0	1
250.0	TO	300.0	1
300.0	TO	400.0	2
400.0	TO	500.0	1
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 308

541 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	158
7 TO	10	22 TO	32	42
10 TO	12	32 TO	39	20
12 TO	14	39 TO	45	10
14 TO	16	45 TO	52	10
16 TO	17	52 TO	55	2
17 TO	20	55 TO	65	6
20 TO	22	65 TO	72	6
22 TO	24	72 TO	78	2
24 TO	26	78 TO	85	5
26 TO	28	85 TO	91	1
28 TO	30	91 TO	98	4
30 TO	32	98 TO	104	2
32 TO	39	104 TO	127	5
39 TO	45	127 TO	147	3
45 TO	55	147 TO	180	7
55 TO	71	180 TO	232	5
71 TO	100	232 TO	328	6
OVER	100	OVER	328	14

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	1
1.0	TO	1.1	0
1.1	TO	1.2	2
1.2	TO	1.3	8
1.3	TO	1.4	61
1.4	TO	1.5	35
1.5	TO	1.6	20
1.6	TO	1.7	40
1.7	TO	1.8	29
1.8	TO	1.9	12
1.9	TO	2.0	16
2.0	TO	2.4	34
2.4	TO	2.6	7
2.6	TO	2.8	8
2.8	TO	3.0	8
3.0	TO	3.5	9
3.5	TO	4.0	3
4.0	TO	4.5	5
OVER		4.5	10

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 2.5 σ
2.0 - 2.6 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	120
5.0 TO	10.0	8
10.0 TO	15.0	2
15.0 TO	20.0	3
20.0 TO	25.0	0
25.0 TO	30.0	2
30.0 TO	35.0	0
35.0 TO	40.0	1
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	1
75.0 TO	100.0	3
100.0 TO	150.0	0
150.0 TO	200.0	1
200.0 TO	250.0	1
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 142

197 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	79
7 TO	10	22 TO	32	20
10 TO	12	32 TO	39	3
12 TO	14	39 TO	45	13
14 TO	16	45 TO	52	6
16 TO	17	52 TO	55	1
17 TO	20	55 TO	65	1
20 TO	22	65 TO	72	0
22 TO	24	72 TO	78	2
24 TO	26	78 TO	85	1
26 TO	28	85 TO	91	1
28 TO	30	91 TO	98	1
30 TO	32	98 TO	104	0
32 TO	39	104 TO	127	3
39 TO	45	127 TO	147	0
45 TO	55	147 TO	180	2
55 TO	71	180 TO	232	2
71 TO	100	232 TO	328	2
OVER	100	OVER	328	5

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	3
1.2 TO	1.3	6
1.3 TO	1.4	35
1.4 TO	1.5	13
1.5 TO	1.6	7
1.6 TO	1.7	16
1.7 TO	1.8	8
1.8 TO	1.9	12
1.9 TO	2.0	9
2.0 TO	2.4	19
2.4 TO	2.6	3
2.6 TO	2.8	1
2.8 TO	3.0	1
3.0 TO	3.5	4
3.5 TO	4.0	1
4.0 TO	4.5	1
OVER	4.5	3

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.0 σ, 2.0 - 2.6 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	33
5.0	TO	10.0	3
10.0	TO	15.0	1
15.0	TO	20.0	2
20.0	TO	25.0	0
25.0	TO	30.0	1
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	1
50.0	TO	75.0	1
75.0	TO	100.0	0
100.0	TO	150.0	1
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0
TOTAL NUMBER OF HOT SPOT		=	43

83 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	22
7	TO	10	22	TO	32	5
10	TO	12	32	TO	39	3
12	TO	14	39	TO	45	2
14	TO	16	45	TO	52	2
16	TO	17	52	TO	55	2
17	TO	20	55	TO	65	1
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	1
45	TO	55	147	TO	180	1
55	TO	71	180	TO	232	1
71	TO	100	232	TO	328	3
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	0
1.2	TO	1.3	0
1.3	TO	1.4	9
1.4	TO	1.5	6
1.5	TO	1.6	2
1.6	TO	1.7	8
1.7	TO	1.8	3
1.8	TO	1.9	1
1.9	TO	2.0	3
2.0	TO	2.4	5
2.4	TO	2.6	0
2.6	TO	2.8	3
2.8	TO	3.0	1
3.0	TO	3.5	1
3.5	TO	4.0	1
4.0	TO	4.5	0
OVER		4.5	0

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	222
5.0	TO	10.0	33
10.0	TO	15.0	11
15.0	TO	20.0	4
20.0	TO	25.0	5
25.0	TO	30.0	5
30.0	TO	35.0	0
35.0	TO	40.0	1
40.0	TO	45.0	1
45.0	TO	50.0	1
50.0	TO	75.0	3
75.0	TO	100.0	1
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 287

199 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	136
7	TO	10	22	TO	32	44
10	TO	12	32	TO	39	30
12	TO	14	39	TO	45	9
14	TO	16	45	TO	52	14
16	TO	17	52	TO	55	4
17	TO	20	55	TO	65	13
20	TO	22	65	TO	72	4
22	TO	24	72	TO	78	4
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	6
28	TO	30	91	TO	98	2
30	TO	32	98	TO	104	3
32	TO	39	104	TO	127	3
39	TO	45	127	TO	147	4
45	TO	55	147	TO	180	3
55	TO	71	180	TO	232	3
71	TO	100	232	TO	328	3
OVER		100	OVER		328	2

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	21
1.2	TO	1.3	22
1.3	TO	1.4	57
1.4	TO	1.5	38
1.5	TO	1.6	27
1.6	TO	1.7	27
1.7	TO	1.8	22
1.8	TO	1.9	23
1.9	TO	2.0	12
2.0	TO	2.4	17
2.4	TO	2.6	11
2.6	TO	2.8	4
2.8	TO	3.0	1
3.0	TO	3.5	1
3.5	TO	4.0	3
4.0	TO	4.5	1
OVER		4.5	0

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 3.0 σ
4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	105
5.0	TO	10.0	10
10.0	TO	15.0	3
15.0	TO	20.0	3
20.0	TO	25.0	1
25.0	TO	30.0	0
30.0	TO	35.0	1
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	1
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 124

96 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	70
7	TO	10	22	TO	32	22
10	TO	12	32	TO	39	8
12	TO	14	39	TO	45	6
14	TO	16	45	TO	52	5
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	4
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	1
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	4
32	TO	39	104	TO	127	1
39	TO	45	127	TO	147	1
45	TO	55	147	TO	180	1
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	1
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	9
1.2	TO	1.3	13
1.3	TO	1.4	29
1.4	TO	1.5	18
1.5	TO	1.6	20
1.6	TO	1.7	6
1.7	TO	1.8	9
1.8	TO	1.9	3
1.9	TO	2.0	3
2.0	TO	2.4	9
2.4	TO	2.6	2
2.6	TO	2.8	1
2.8	TO	3.0	1
3.0	TO	3.5	1
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	35
5.0	TO	10.0	2
10.0	TO	15.0	0
15.0	TO	20.0	1
20.0	TO	25.0	1
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 39

28 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	22
7	TO	10	22	TO	32	5
10	TO	12	32	TO	39	6
12	TO	14	39	TO	45	1
14	TO	16	45	TO	52	2
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	0
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	1
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	2
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	3
1.2	TO	1.3	6
1.3	TO	1.4	9
1.4	TO	1.5	5
1.5	TO	1.6	6
1.6	TO	1.7	2
1.7	TO	1.8	2
1.8	TO	1.9	0
1.9	TO	2.0	0
2.0	TO	2.4	4
2.4	TO	2.6	1
2.6	TO	2.8	0
2.8	TO	3.0	1
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.5 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	339
5.0 TO	10.0	50
10.0 TO	15.0	10
15.0 TO	20.0	5
20.0 TO	25.0	3
25.0 TO	30.0	3
30.0 TO	35.0	3
35.0 TO	40.0	2
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	5
75.0 TO	100.0	1
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 421

342 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	217
7 TO	10	22 TO	32	64
10 TO	12	32 TO	39	38
12 TO	14	39 TO	45	21
14 TO	16	45 TO	52	14
16 TO	17	52 TO	55	5
17 TO	20	55 TO	65	13
20 TO	22	65 TO	72	9
22 TO	24	72 TO	78	5
24 TO	26	78 TO	85	4
26 TO	28	85 TO	91	3
28 TO	30	91 TO	98	3
30 TO	32	98 TO	104	3
32 TO	39	104 TO	127	4
39 TO	45	127 TO	147	4
45 TO	55	147 TO	180	3
55 TO	71	180 TO	232	3
71 TO	100	232 TO	328	6
OVER	100	OVER	328	2

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	22
1.2 TO	1.3	39
1.3 TO	1.4	79
1.4 TO	1.5	69
1.5 TO	1.6	46
1.6 TO	1.7	46
1.7 TO	1.8	19
1.8 TO	1.9	18
1.9 TO	2.0	14
2.0 TO	2.4	41
2.4 TO	2.6	11
2.6 TO	2.8	4
2.8 TO	3.0	2
3.0 TO	3.5	8
3.5 TO	4.0	1
4.0 TO	4.5	2
OVER	4.5	0

TABLE 7 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 3.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	165
5.0	TO	10.0	9
10.0	TO	15.0	4
15.0	TO	20.0	2
20.0	TO	25.0	2
25.0	TO	30.0	1
30.0	TO	35.0	0
35.0	TO	40.0	1
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	1
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 185

167 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	109
7	TO	10	22	TO	32	35
10	TO	12	32	TO	39	12
12	TO	14	39	TO	45	4
14	TO	16	45	TO	52	3
16	TO	17	52	TO	55	4
17	TO	20	55	TO	65	4
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	2
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	3
28	TO	30	91	TO	98	1
30	TO	32	98	TO	104	1
32	TO	39	104	TO	127	3
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	2
55	TO	71	180	TO	232	1
71	TO	100	232	TO	328	1
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	6
1.2	TO	1.3	14
1.3	TO	1.4	50
1.4	TO	1.5	37
1.5	TO	1.6	18
1.6	TO	1.7	15
1.7	TO	1.8	13
1.8	TO	1.9	6
1.9	TO	2.0	2
2.0	TO	2.4	16
2.4	TO	2.6	3
2.6	TO	2.8	0
2.8	TO	3.0	1
3.0	TO	3.5	4
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 7 (Concluded)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.5 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	45
5.0	TO	10.0	5
10.0	TO	15.0	1
15.0	TO	20.0	1
20.0	TO	25.0	1
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 53

52 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	28
7	TO	10	22	TO	32	12
10	TO	12	32	TO	39	4
12	TO	14	39	TO	45	0
14	TO	16	45	TO	52	1
16	TO	17	52	TO	55	1
17	TO	20	55	TO	65	3
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	2
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	1
45	TO	55	147	TO	180	1
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	2
1.2	TO	1.3	7
1.3	TO	1.4	8
1.4	TO	1.5	7
1.5	TO	1.6	8
1.6	TO	1.7	5
1.7	TO	1.8	6
1.8	TO	1.9	2
1.9	TO	2.0	2
2.0	TO	2.4	2
2.4	TO	2.6	2
2.6	TO	2.8	1
2.8	TO	3.0	0
3.0	TO	3.5	1
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 8

Camp A.P. Hill Area - Evening
AREA DISTRIBUTIONS

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 1.0 σ
4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	339
5.0	TO	10.0	47
10.0	TO	15.0	22
15.0	TO	20.0	9
20.0	TO	25.0	9
25.0	TO	30.0	8
30.0	TO	35.0	2
35.0	TO	40.0	1
40.0	TO	45.0	4
45.0	TO	50.0	0
50.0	TO	75.0	5
75.0	TO	100.0	3
100.0	TO	150.0	1
150.0	TO	200.0	1
200.0	TO	250.0	0
250.0	TO	300.0	1
300.0	TO	400.0	0
400.0	TO	500.0	1
OVER		500.0	6

TOTAL NUMBER OF HOT SPOT = 459

721 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	192
7	TO	10	22	TO	32	72
10	TO	12	32	TO	39	32
12	TO	14	39	TO	45	29
14	TO	16	45	TO	52	24
16	TO	17	52	TO	55	3
17	TO	20	55	TO	65	16
20	TO	22	65	TO	72	8
22	TO	24	72	TO	78	5
24	TO	26	78	TO	85	5
26	TO	28	85	TO	91	7
28	TO	30	91	TO	98	6
30	TO	32	98	TO	104	5
32	TO	39	104	TO	127	11
39	TO	45	127	TO	147	8
45	TO	55	147	TO	180	7
55	TO	71	180	TO	232	7
71	TO	100	232	TO	328	4
OVER		100	OVER		328	18

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	8
1.2	TO	1.3	9
1.3	TO	1.4	72
1.4	TO	1.5	49
1.5	TO	1.6	45
1.6	TO	1.7	55
1.7	TO	1.8	29
1.8	TO	1.9	26
1.9	TO	2.0	31
2.0	TO	2.4	59
2.4	TO	2.6	14
2.6	TO	2.8	15
2.8	TO	3.0	6
3.0	TO	3.5	12
3.5	TO	4.0	9
4.0	TO	4.5	4
OVER		4.5	16

TABLE 8 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT

(Threshold = Ave. + 2.0 σ
4.5 - 5.5 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	311
5.0 TO	10.0	35
10.0 TO	15.0	10
15.0 TO	20.0	2
20.0 TO	25.0	3
25.0 TO	30.0	2
30.0 TO	35.0	0
35.0 TO	40.0	1
40.0 TO	45.0	1
45.0 TO	50.0	0
50.0 TO	75.0	0
75.0 TO	100.0	1
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	1

TOTAL NUMBER OF HOT SPOT = 367

611 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	171
7 TO	10	22 TO	32	75
10 TO	12	32 TO	39	25
12 TO	14	39 TO	45	17
14 TO	16	45 TO	52	14
16 TO	17	52 TO	55	3
17 TO	20	55 TO	65	15
20 TO	22	65 TO	72	4
22 TO	24	72 TO	78	11
24 TO	26	78 TO	85	4
26 TO	28	85 TO	91	3
28 TO	30	91 TO	98	5
30 TO	32	98 TO	104	2
32 TO	39	104 TO	127	7
39 TO	45	127 TO	147	2
45 TO	55	147 TO	180	1
55 TO	71	180 TO	232	2
71 TO	100	232 TO	328	2
OVER	100	OVER	328	4

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	8
1.2 TO	1.3	11
1.3 TO	1.4	61
1.4 TO	1.5	20
1.5 TO	1.6	15
1.6 TO	1.7	52
1.7 TO	1.8	30
1.8 TO	1.9	19
1.9 TO	2.0	33
2.0 TO	2.4	61
2.4 TO	2.6	17
2.6 TO	2.8	10
2.8 TO	3.0	7
3.0 TO	3.5	12
3.5 TO	4.0	5
4.0 TO	4.5	1
OVER	4.5	5

TABLE 8 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.0 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	11
5.0	TO	10.0	2
10.0	TO	15.0	0
15.0	TO	20.0	0
20.0	TO	25.0	0
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	1
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 14

2 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	5
7	TO	10	22	TO	32	5
10	TO	12	32	TO	39	0
12	TO	14	39	TO	45	1
14	TO	16	45	TO	52	1
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	1
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	1

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	2
1.2	TO	1.3	3
1.3	TO	1.4	3
1.4	TO	1.5	2
1.5	TO	1.6	2
1.6	TO	1.7	0
1.7	TO	1.8	0
1.8	TO	1.9	0
1.9	TO	2.0	1
2.0	TO	2.4	0
2.4	TO	2.6	0
2.6	TO	2.8	0
2.8	TO	3.0	0
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	1

TABLE 8 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	237
5.0	TO	10.0	39
10.0	TO	15.0	19
15.0	TO	20.0	4
20.0	TO	25.0	2
25.0	TO	30.0	1
30.0	TO	35.0	0
35.0	TO	40.0	1
40.0	TO	45.0	1
45.0	TO	50.0	1
50.0	TO	75.0	2
75.0	TO	100.0	1
100.0	TO	150.0	2
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	1
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 311

165 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	146
7	TO	10	22	TO	32	61
10	TO	12	32	TO	39	21
12	TO	14	39	TO	45	15
14	TO	16	45	TO	52	13
16	TO	17	52	TO	55	5
17	TO	20	55	TO	65	9
20	TO	22	65	TO	72	2
22	TO	24	72	TO	78	2
24	TO	26	78	TO	85	5
26	TO	28	85	TO	91	7
28	TO	30	91	TO	98	1
30	TO	32	98	TO	104	7
32	TO	39	104	TO	127	3
39	TO	45	127	TO	147	3
45	TO	55	147	TO	180	2
55	TO	71	180	TO	232	1
71	TO	100	232	TO	328	3
OVER		100	OVER		328	5

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	16
1.2	TO	1.3	25
1.3	TO	1.4	74
1.4	TO	1.5	42
1.5	TO	1.6	27
1.6	TO	1.7	41
1.7	TO	1.8	20
1.8	TO	1.9	11
1.9	TO	2.0	7
2.0	TO	2.4	22
2.4	TO	2.6	5
2.6	TO	2.8	9
2.8	TO	3.0	4
3.0	TO	3.5	2
3.5	TO	4.0	1
4.0	TO	4.5	2
OVER		4.5	3

TABLE 8 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.5 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	23
5.0	TO	10.0	2
10.0	TO	15.0	0
15.0	TO	20.0	0
20.0	TO	25.0	0
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 25

20 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	14
7	TO	10	22	TO	32	5
10	TO	12	32	TO	39	2
12	TO	14	39	TO	45	1
14	TO	16	45	TO	52	0
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	3
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	4
1.2	TO	1.3	2
1.3	TO	1.4	6
1.4	TO	1.5	5
1.5	TO	1.6	2
1.6	TO	1.7	2
1.7	TO	1.8	2
1.8	TO	1.9	1
1.9	TO	2.0	0
2.0	TO	2.4	0
2.4	TO	2.6	0
2.6	TO	2.8	1
2.8	TO	3.0	0
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 8 (Concluded)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	12
5.0	TO	10.0	1
10.0	TO	15.0	0
15.0	TO	20.0	0
20.0	TO	25.0	0
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	0

TOTAL NUMBER OF HOT SPOT = 13

3 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	7
7	TO	10	22	TO	32	4
10	TO	12	32	TO	39	2
12	TO	14	39	TO	45	0
14	TO	16	45	TO	52	0
16	TO	17	52	TO	55	0
17	TO	20	55	TO	65	0
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	0

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	4
1.2	TO	1.3	3
1.3	TO	1.4	1
1.4	TO	1.5	1
1.5	TO	1.6	1
1.6	TO	1.7	0
1.7	TO	1.8	1
1.8	TO	1.9	1
1.9	TO	2.0	0
2.0	TO	2.4	1
2.4	TO	2.6	0
2.6	TO	2.8	0
2.8	TO	3.0	0
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	0

TABLE 9

Camp A.P. Hill Area - Midnight
AREA DISTRIBUTIONS

DISTRIBUTION OF RECOGNIZED HOT SPOT BY AREA

(Threshold = Ave. + 0.5 σ
4.5 - 5.5 μm)

SQUARE METERS		FREQUENCY
0.0 TO	5.0	1132
5.0 TO	10.0	81
10.0 TO	15.0	34
15.0 TO	20.0	24
20.0 TO	25.0	11
25.0 TO	30.0	7
30.0 TO	35.0	11
35.0 TO	40.0	2
40.0 TO	45.0	4
45.0 TO	50.0	6
50.0 TO	75.0	8
75.0 TO	100.0	3
100.0 TO	150.0	1
150.0 TO	200.0	2
200.0 TO	250.0	1
250.0 TO	300.0	2
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	7

TOTAL NUMBER OF HOT SPOT = 1336

3462 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	741
7 TO	10	22 TO	32	202
10 TO	12	32 TO	39	70
12 TO	14	39 TO	45	48
14 TO	16	45 TO	52	35
16 TO	17	52 TO	55	15
17 TO	20	55 TO	65	29
20 TO	22	65 TO	72	22
22 TO	24	72 TO	78	16
24 TO	26	78 TO	85	16
26 TO	28	85 TO	91	15
28 TO	30	91 TO	98	5
30 TO	32	98 TO	104	10
32 TO	39	104 TO	127	21
39 TO	45	127 TO	147	14
45 TO	55	147 TO	180	20
55 TO	71	180 TO	232	16
71 TO	100	232 TO	328	12
OVER	100	OVER	328	29

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	2
1.0 TO	1.1	0
1.1 TO	1.2	25
1.2 TO	1.3	29
1.3 TO	1.4	260
1.4 TO	1.5	112
1.5 TO	1.6	70
1.6 TO	1.7	220
1.7 TO	1.8	89
1.8 TO	1.9	56
1.9 TO	2.0	90
2.0 TO	2.4	169
2.4 TO	2.6	49
2.6 TO	2.8	34
2.8 TO	3.0	29
3.0 TO	3.5	46
3.5 TO	4.0	16
4.0 TO	4.5	13
OVER	4.5	27

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 1.0 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	661
5.0	TO	10.0	70
10.0	TO	15.0	15
15.0	TO	20.0	8
20.0	TO	25.0	9
25.0	TO	30.0	3
30.0	TO	35.0	5
35.0	TO	40.0	2
40.0	TO	45.0	0
45.0	TO	50.0	2
50.0	TO	75.0	4
75.0	TO	100.0	6
100.0	TO	150.0	2
150.0	TO	200.0	1
200.0	TO	250.0	0
250.0	TO	300.0	1
300.0	TO	400.0	1
400.0	TO	500.0	1
OVER		500.0	6

TOTAL NUMBER OF HOT SPOT = 797

1749 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	417
7	TO	10	22	TO	32	126
10	TO	12	32	TO	39	35
12	TO	14	39	TO	45	30
14	TO	16	45	TO	52	26
16	TO	17	52	TO	55	12
17	TO	20	55	TO	65	31
20	TO	22	65	TO	72	14
22	TO	24	72	TO	78	9
24	TO	26	78	TO	85	10
26	TO	28	85	TO	91	7
28	TO	30	91	TO	98	6
30	TO	32	98	TO	104	7
32	TO	39	104	TO	127	9
39	TO	45	127	TO	147	12
45	TO	55	147	TO	180	9
55	TO	71	180	TO	232	5
71	TO	100	232	TO	328	6
OVER		100	OVER		328	26

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	13
1.2	TO	1.3	17
1.3	TO	1.4	128
1.4	TO	1.5	70
1.5	TO	1.6	43
1.6	TO	1.7	128
1.7	TO	1.8	60
1.8	TO	1.9	35
1.9	TO	2.0	47
2.0	TO	2.4	122
2.4	TO	2.6	33
2.6	TO	2.8	26
2.8	TO	3.0	11
3.0	TO	3.5	16
3.5	TO	4.0	17
4.0	TO	4.5	3
OVER		4.5	28

AD-A074 898 ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR IN--ETC F/G 8/6
STATISTICAL ANALYSIS OF TERRAIN BACKGROUNDS AT CAMP A.P. HILL, --ETC(U)
AUG 79 A J LAROCCA N60530-78-C-0009
UNCLASSIFIED ERIM-132300-4-F NL

2 OF 2
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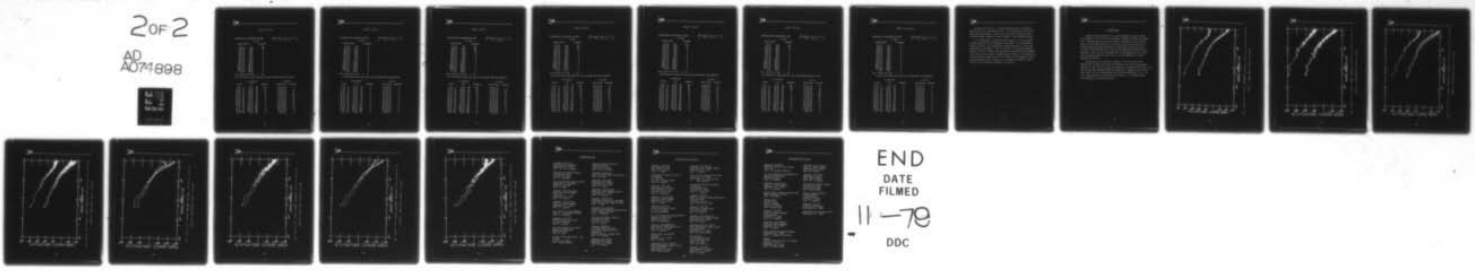

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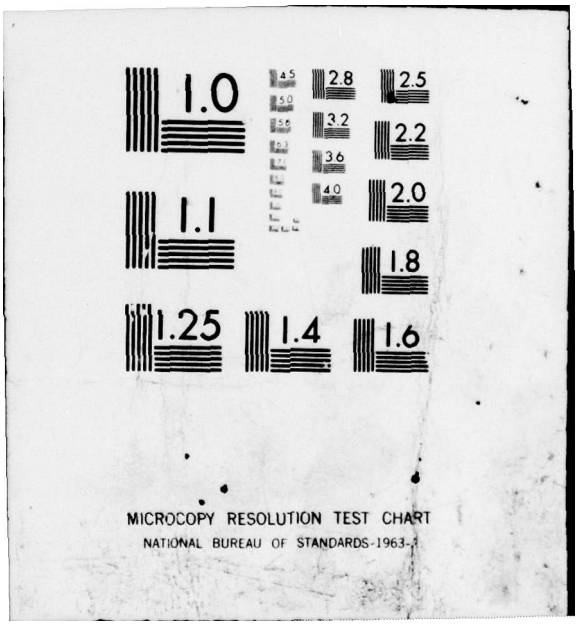
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2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 1.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	422
5.0	TO	10.0	30
10.0	TO	15.0	9
15.0	TO	20.0	4
20.0	TO	25.0	5
25.0	TO	30.0	1
30.0	TO	35.0	3
35.0	TO	40.0	1
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	3
75.0	TO	100.0	1
100.0	TO	150.0	3
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	1
300.0	TO	400.0	1
400.0	TO	500.0	1
OVER		500.0	1

TOTAL NUMBER OF HOT SPOT = 486

1234 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	259
7	TO	10	22	TO	32	78
10	TO	12	32	TO	39	33
12	TO	14	39	TO	45	23
14	TO	16	45	TO	52	10
16	TO	17	52	TO	55	7
17	TO	20	55	TO	65	16
20	TO	22	65	TO	72	5
22	TO	24	72	TO	78	6
24	TO	26	78	TO	85	5
26	TO	28	85	TO	91	4
28	TO	30	91	TO	98	3
30	TO	32	98	TO	104	4
32	TO	39	104	TO	127	5
39	TO	45	127	TO	147	4
45	TO	55	147	TO	180	3
55	TO	71	180	TO	232	3
71	TO	100	232	TO	328	5
OVER		100	OVER		328	13

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	9
1.2	TO	1.3	9
1.3	TO	1.4	86
1.4	TO	1.5	48
1.5	TO	1.6	29
1.6	TO	1.7	70
1.7	TO	1.8	31
1.8	TO	1.9	21
1.9	TO	2.0	39
2.0	TO	2.4	63
2.4	TO	2.6	18
2.6	TO	2.8	11
2.8	TO	3.0	11
3.0	TO	3.5	16
3.5	TO	4.0	4
4.0	TO	4.5	3
OVER		4.5	18

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.5 σ, 4.5 - 5.5 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	7
5.0	TO	10.0	3
10.0	TO	15.0	1
15.0	TO	20.0	0
20.0	TO	25.0	0
25.0	TO	30.0	0
30.0	TO	35.0	0
35.0	TO	40.0	0
40.0	TO	45.0	0
45.0	TO	50.0	0
50.0	TO	75.0	0
75.0	TO	100.0	0
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	1

TOTAL NUMBER OF HOT SPOT = 12

7 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	2
7	TO	10	22	TO	32	5
10	TO	12	32	TO	39	2
12	TO	14	39	TO	45	1
14	TO	16	45	TO	52	0
16	TO	17	52	TO	55	1
17	TO	20	55	TO	65	0
20	TO	22	65	TO	72	0
22	TO	24	72	TO	78	0
24	TO	26	78	TO	85	0
26	TO	28	85	TO	91	0
28	TO	30	91	TO	98	0
30	TO	32	98	TO	104	0
32	TO	39	104	TO	127	0
39	TO	45	127	TO	147	0
45	TO	55	147	TO	180	0
55	TO	71	180	TO	232	0
71	TO	100	232	TO	328	0
OVER		100	OVER		328	1

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	2
1.2	TO	1.3	1
1.3	TO	1.4	3
1.4	TO	1.5	3
1.5	TO	1.6	1
1.6	TO	1.7	1
1.7	TO	1.8	0
1.8	TO	1.9	0
1.9	TO	2.0	0
2.0	TO	2.4	0
2.4	TO	2.6	0
2.6	TO	2.8	0
2.8	TO	3.0	0
3.0	TO	3.5	0
3.5	TO	4.0	0
4.0	TO	4.5	0
OVER		4.5	1

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 0.5 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	478
5.0	TO	10.0	102
10.0	TO	15.0	52
15.0	TO	20.0	18
20.0	TO	25.0	16
25.0	TO	30.0	9
30.0	TO	35.0	6
35.0	TO	40.0	4
40.0	TO	45.0	3
45.0	TO	50.0	3
50.0	TO	75.0	9
75.0	TO	100.0	4
100.0	TO	150.0	6
150.0	TO	200.0	3
200.0	TO	250.0	1
250.0	TO	300.0	3
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	9

TOTAL NUMBER OF HOT SPOT = 726

389 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	284
7 TO	10	22 TO	32	124
10 TO	12	32 TO	39	48
12 TO	14	39 TO	45	41
14 TO	16	45 TO	52	32
16 TO	17	52 TO	55	16
17 TO	20	55 TO	65	40
20 TO	22	65 TO	72	14
22 TO	24	72 TO	78	8
24 TO	26	78 TO	85	6
26 TO	28	85 TO	91	12
28 TO	30	91 TO	98	8
30 TO	32	98 TO	104	7
32 TO	39	104 TO	127	17
39 TO	45	127 TO	147	11
45 TO	55	147 TO	180	14
55 TO	71	180 TO	232	11
71 TO	100	232 TO	328	9
OVER	100	OVER	328	24

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	3
1.0	TO	1.1	0
1.1	TO	1.2	33
1.2	TO	1.3	56
1.3	TO	1.4	153
1.4	TO	1.5	89
1.5	TO	1.6	77
1.6	TO	1.7	67
1.7	TO	1.8	44
1.8	TO	1.9	37
1.9	TO	2.0	32
2.0	TO	2.4	62
2.4	TO	2.6	17
2.6	TO	2.8	13
2.8	TO	3.0	11
3.0	TO	3.5	11
3.5	TO	4.0	6
4.0	TO	4.5	4
OVER		4.5	11

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 1.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	414
5.0	TO	10.0	83
10.0	TO	15.0	19
15.0	TO	20.0	25
20.0	TO	25.0	4
25.0	TO	30.0	7
30.0	TO	35.0	6
35.0	TO	40.0	0
40.0	TO	45.0	1
45.0	TO	50.0	0
50.0	TO	75.0	3
75.0	TO	100.0	2
100.0	TO	150.0	3
150.0	TO	200.0	1
200.0	TO	250.0	2
250.0	TO	300.0	1
300.0	TO	400.0	0
400.0	TO	500.0	1
OVER		500.0	9

TOTAL NUMBER OF HOT SPOT = 581

324 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	251
7	TO	10	22	TO	32	110
10	TO	12	32	TO	39	34
12	TO	14	39	TO	45	37
14	TO	16	45	TO	52	24
16	TO	17	52	TO	55	8
17	TO	20	55	TO	65	22
20	TO	22	65	TO	72	15
22	TO	24	72	TO	78	11
24	TO	26	78	TO	85	9
26	TO	28	85	TO	91	4
28	TO	30	91	TO	98	5
30	TO	32	98	TO	104	3
32	TO	39	104	TO	127	9
39	TO	45	127	TO	147	7
45	TO	55	147	TO	180	7
55	TO	71	180	TO	232	3
71	TO	100	232	TO	328	3
OVER		100	OVER		328	19

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	2
1.0	TO	1.1	0
1.1	TO	1.2	38
1.2	TO	1.3	45
1.3	TO	1.4	125
1.4	TO	1.5	89
1.5	TO	1.6	70
1.6	TO	1.7	52
1.7	TO	1.8	32
1.8	TO	1.9	27
1.9	TO	2.0	19
2.0	TO	2.4	39
2.4	TO	2.6	9
2.6	TO	2.8	9
2.8	TO	3.0	1
3.0	TO	3.5	8
3.5	TO	4.0	4
4.0	TO	4.5	1
OVER		4.5	11

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 1.5 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	257
5.0	TO	10.0	48
10.0	TO	15.0	16
15.0	TO	20.0	14
20.0	TO	25.0	8
25.0	TO	30.0	1
30.0	TO	35.0	2
35.0	TO	40.0	4
40.0	TO	45.0	1
45.0	TO	50.0	0
50.0	TO	75.0	3
75.0	TO	100.0	0
100.0	TO	150.0	2
150.0	TO	200.0	2
200.0	TO	250.0	0
250.0	TO	300.0	0
300.0	TO	400.0	2
400.0	TO	500.0	1
OVER		500.0	3

TOTAL NUMBER OF HOT SPOT = 364

248 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS			FEET			FREQUENCY
0	TO	7	0	TO	22	162
7	TO	10	22	TO	32	60
10	TO	12	32	TO	39	15
12	TO	14	39	TO	45	29
14	TO	16	45	TO	52	13
16	TO	17	52	TO	55	8
17	TO	20	55	TO	65	18
20	TO	22	65	TO	72	8
22	TO	24	72	TO	78	5
24	TO	26	78	TO	85	3
26	TO	28	85	TO	91	5
28	TO	30	91	TO	98	1
30	TO	32	98	TO	104	2
32	TO	39	104	TO	127	9
39	TO	45	127	TO	147	4
45	TO	55	147	TO	180	2
55	TO	71	180	TO	232	6
71	TO	100	232	TO	328	5
OVER		100	OVER		328	9

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	27
1.2	TO	1.3	26
1.3	TO	1.4	87
1.4	TO	1.5	47
1.5	TO	1.6	48
1.6	TO	1.7	28
1.7	TO	1.8	16
1.8	TO	1.9	17
1.9	TO	2.0	12
2.0	TO	2.4	30
2.4	TO	2.6	4
2.6	TO	2.8	2
2.8	TO	3.0	3
3.0	TO	3.5	7
3.5	TO	4.0	2
4.0	TO	4.5	0
OVER		4.5	8

TABLE 9 (Cont'd)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 2.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS			FREQUENCY
0.0	TO	5.0	219
5.0	TO	10.0	30
10.0	TO	15.0	9
15.0	TO	20.0	6
20.0	TO	25.0	5
25.0	TO	30.0	1
30.0	TO	35.0	1
35.0	TO	40.0	2
40.0	TO	45.0	1
45.0	TO	50.0	1
50.0	TO	75.0	3
75.0	TO	100.0	1
100.0	TO	150.0	0
150.0	TO	200.0	0
200.0	TO	250.0	0
250.0	TO	300.0	1
300.0	TO	400.0	0
400.0	TO	500.0	0
OVER		500.0	1

TOTAL NUMBER OF HOT SPOT = 281

187 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	132
7 TO	10	22 TO	32	56
10 TO	12	32 TO	39	15
12 TO	14	39 TO	45	19
14 TO	16	45 TO	52	11
16 TO	17	52 TO	55	3
17 TO	20	55 TO	65	7
20 TO	22	65 TO	72	3
22 TO	24	72 TO	78	2
24 TO	26	78 TO	85	4
26 TO	28	85 TO	91	2
28 TO	30	91 TO	98	2
30 TO	32	98 TO	104	2
32 TO	39	104 TO	127	5
39 TO	45	127 TO	147	6
45 TO	55	147 TO	180	2
55 TO	71	180 TO	232	2
71 TO	100	232 TO	328	3
OVER	100	OVER	328	5

BY SHAPE

SHAPE FACTOR			FREQUENCY
0.0	TO	1.0	0
1.0	TO	1.1	0
1.1	TO	1.2	16
1.2	TO	1.3	21
1.3	TO	1.4	82
1.4	TO	1.5	29
1.5	TO	1.6	25
1.6	TO	1.7	21
1.7	TO	1.8	20
1.8	TO	1.9	11
1.9	TO	2.0	11
2.0	TO	2.4	21
2.4	TO	2.6	10
2.6	TO	2.8	3
2.8	TO	3.0	4
3.0	TO	3.5	0
3.5	TO	4.0	3
4.0	TO	4.5	3
OVER		4.5	1

TABLE 9 (Concluded)

DISTRIBUTION OF RECOGNIZED HOT SPOT (Threshold = Ave. + 3.0 σ, 8.0 - 14.0 μm)

BY AREA

SQUARE METERS		FREQUENCY
0.0 TO	5.0	8
5.0 TO	10.0	1
10.0 TO	15.0	0
15.0 TO	20.0	0
20.0 TO	25.0	0
25.0 TO	30.0	0
30.0 TO	35.0	0
35.0 TO	40.0	0
40.0 TO	45.0	0
45.0 TO	50.0	0
50.0 TO	75.0	0
75.0 TO	100.0	0
100.0 TO	150.0	0
150.0 TO	200.0	0
200.0 TO	250.0	0
250.0 TO	300.0	0
300.0 TO	400.0	0
400.0 TO	500.0	0
OVER	500.0	0

TOTAL NUMBER OF HOT SPOT = 9

4 FEATURES WITH AREAS LESS THAN 0.60 SQ. METERS WERE ALSO RECOGNIZED

BY PERIMETER

METERS		FEET		FREQUENCY
0 TO	7	0 TO	22	3
7 TO	10	22 TO	32	2
10 TO	12	32 TO	39	3
12 TO	14	39 TO	45	1
14 TO	16	45 TO	52	0
16 TO	17	52 TO	55	0
17 TO	20	55 TO	65	0
20 TO	22	65 TO	72	0
22 TO	24	72 TO	78	0
24 TO	26	78 TO	85	0
26 TO	28	85 TO	91	0
28 TO	30	91 TO	98	0
30 TO	32	98 TO	104	0
32 TO	39	104 TO	127	0
39 TO	45	127 TO	147	0
45 TO	55	147 TO	180	0
55 TO	71	180 TO	232	0
71 TO	100	232 TO	328	0
OVER	100	OVER	328	0

BY SHAPE

SHAPE FACTOR		FREQUENCY
0.0 TO	1.0	0
1.0 TO	1.1	0
1.1 TO	1.2	2
1.2 TO	1.3	1
1.3 TO	1.4	2
1.4 TO	1.5	2
1.5 TO	1.6	1
1.6 TO	1.7	0
1.7 TO	1.8	0
1.8 TO	1.9	1
1.9 TO	2.0	0
2.0 TO	2.4	0
2.4 TO	2.6	0
2.6 TO	2.8	0
2.8 TO	3.0	0
3.0 TO	3.5	0
3.5 TO	4.0	0
4.0 TO	4.5	0
OVER	4.5	0

Statistics for the 2.0 - 2.6 micron channel are not included in Figures 15 and 16, and Tables 8 and 9. This is because of the lack of sufficient solar energy at these collection times to produce enough reflected radiant energy to obtain a signal in this wavelength region.

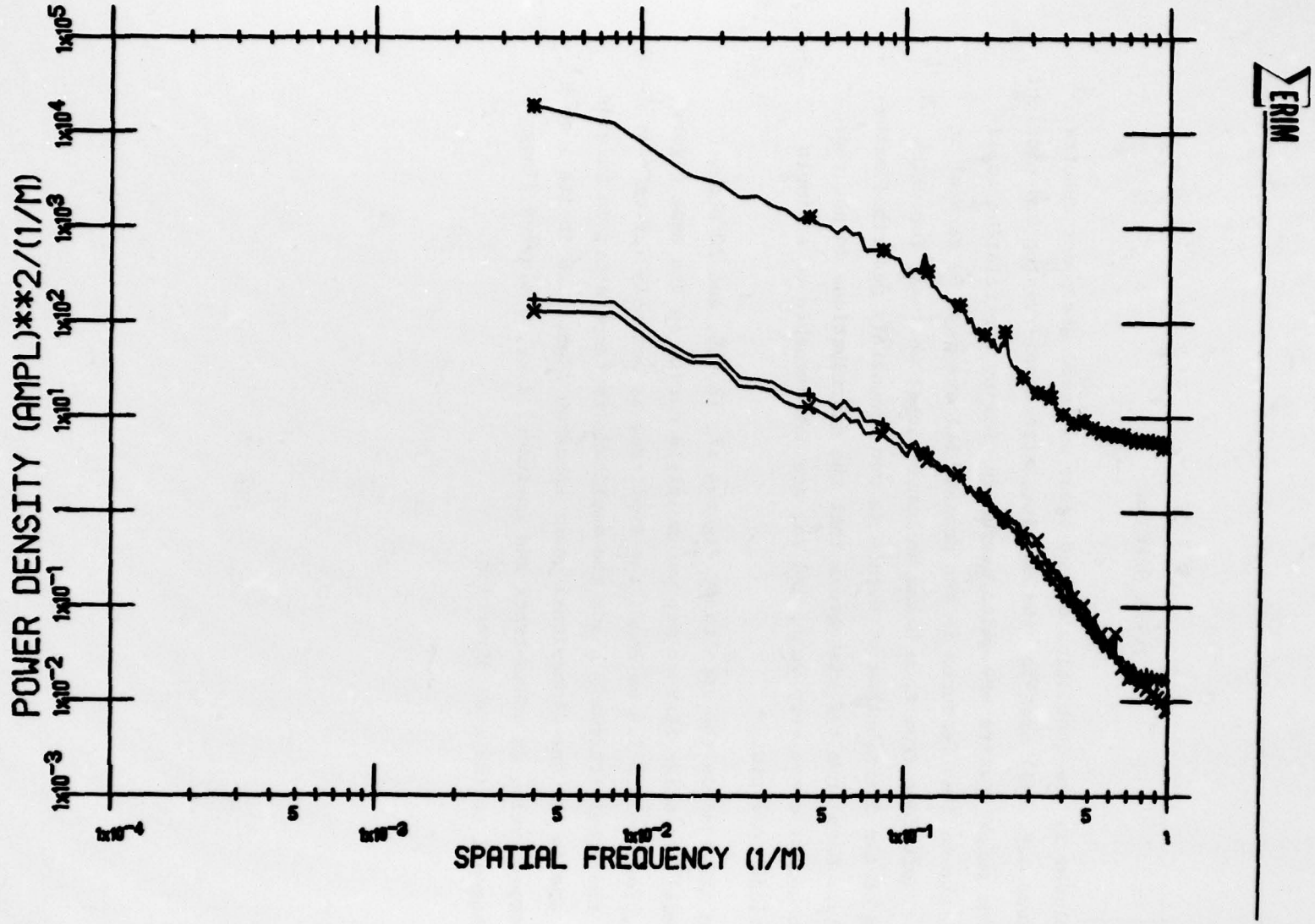
It is interesting to note how details drop out of the successive ellipse "pictures" as the threshold is increased. For the nighttime Figures 15 and 16, the thresholding technique results in a clear identification of the targets. This is not true for the daytime imagery, Figures 13 and 14, because solar heating has caused many other elements in the scene to be as warm or warmer than the targets. The targets are not identified in Figures 13 and 14 as there are not ellipses to specifically represent them. However, as is evident from Figures 2 and 3, they are in the lower-left quadrant of the scene.

5

POWER SPECTRA

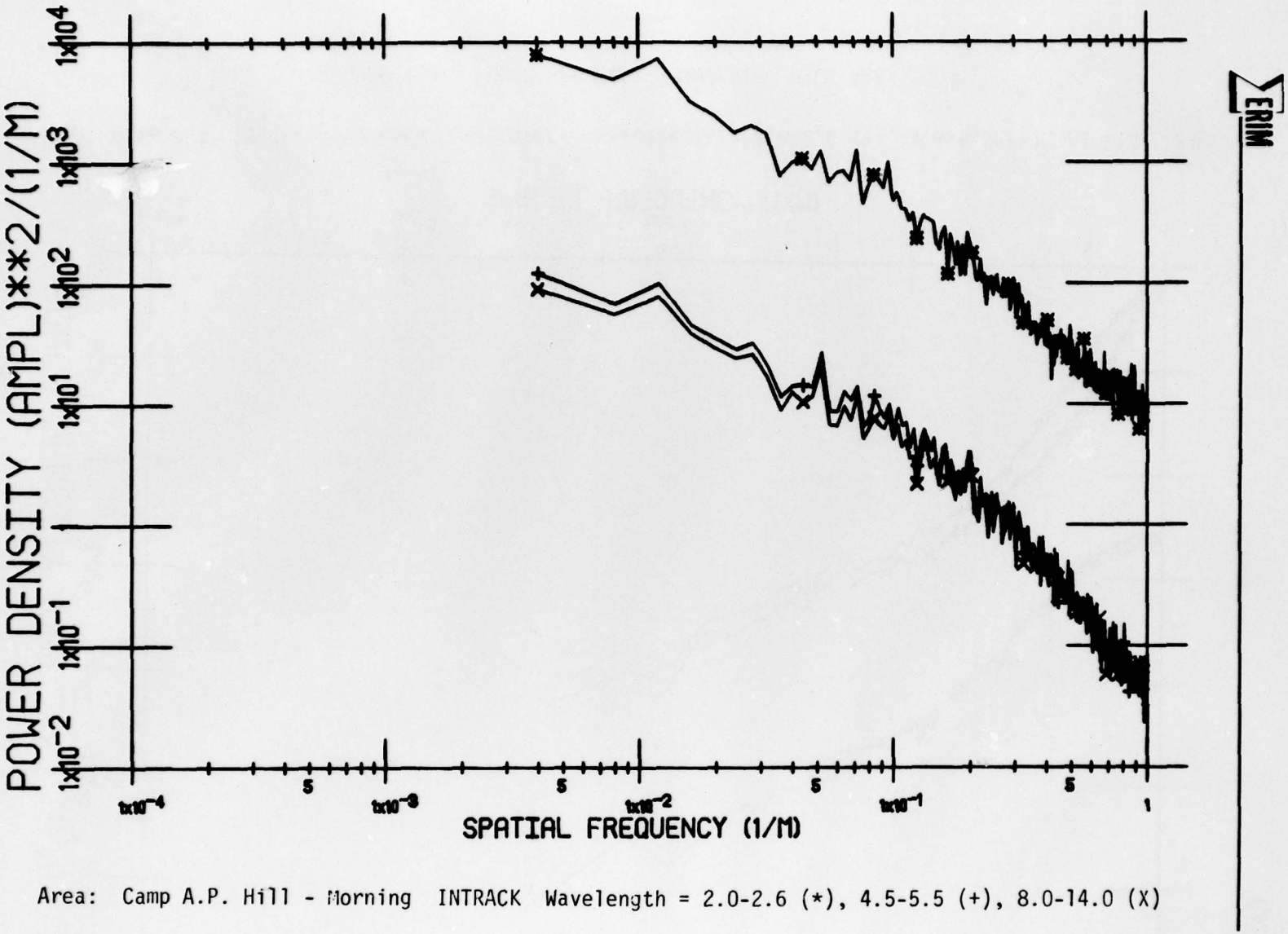
Included in the statistics of the areas analyzed are power spectra of the Camp A.P. Hill area for the morning, afternoon, evening and midnight runs. The power spectra are quite useful in showing the relative amplitudes of the various features in the scenes, but one must be careful in drawing conclusions from them based on conventional analysis for which the form of the distribution of events is not adequately described mathematically. Note from the histograms that the distributions do not reproduce the normal curve very well, and so, are not amenable to a simple mathematical analysis.

The abscissa on the spectra of Figures 17, 18, 19, and 20 shows $(\text{amplitude})^2$ in order that we may put multiple curves on the same figure. However, for the 2.0-2.6 μm band, the amplitude is actually ($\mu W\text{-}cm^{-2}\text{-}sr^{-1}\text{-}\mu m$), and for the other (thermal) bands the amplitude is temperature in Kelvins. Each figure is the one-dimensional power spectrum identified in its a or b part, respectively, as cross-track and in-track; i.e., evaluated along and orthogonal to the scan direction.



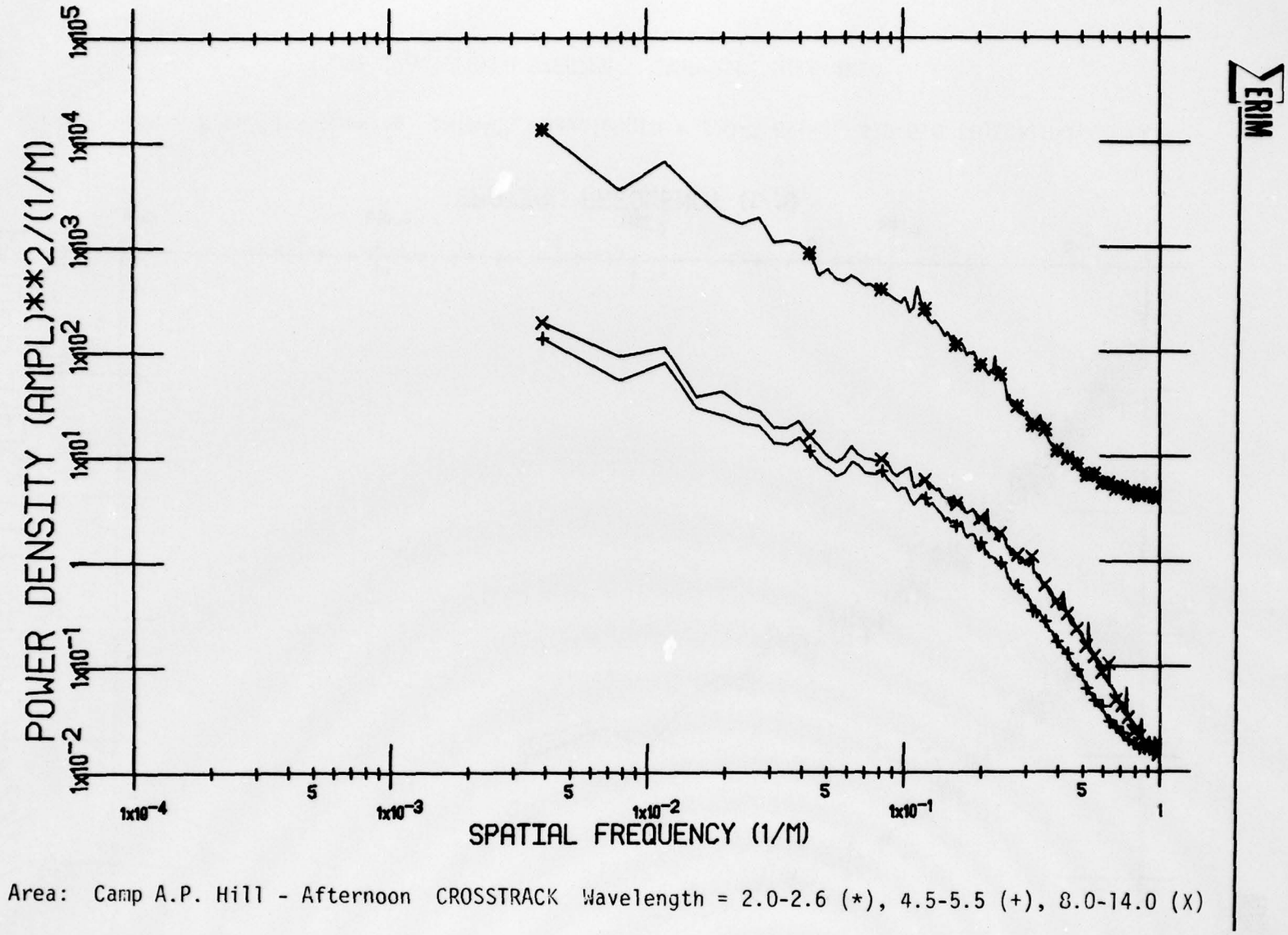
Area: Camp A.P. Hill - Morning CROSSTRACK Wavelength = 2.0-2.6 (*), 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 17a. POWER SPECTRA - CAMP A.P. HILL AREA



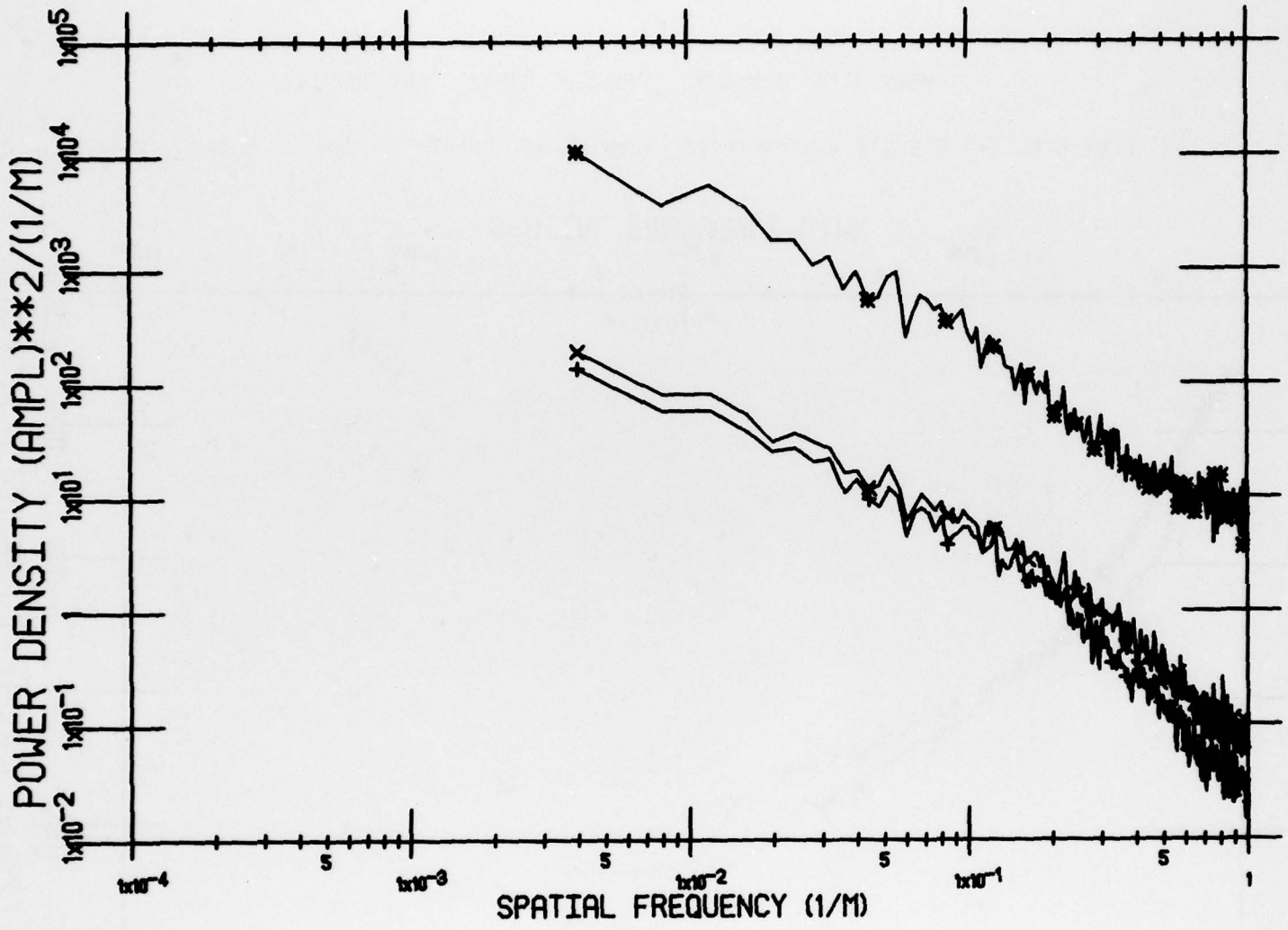
Area: Camp A.P. Hill - Morning INTRACK Wavelength = 2.0-2.6 (*), 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 17b. POWER SPECTRA - CAMP A.P. HILL AREA



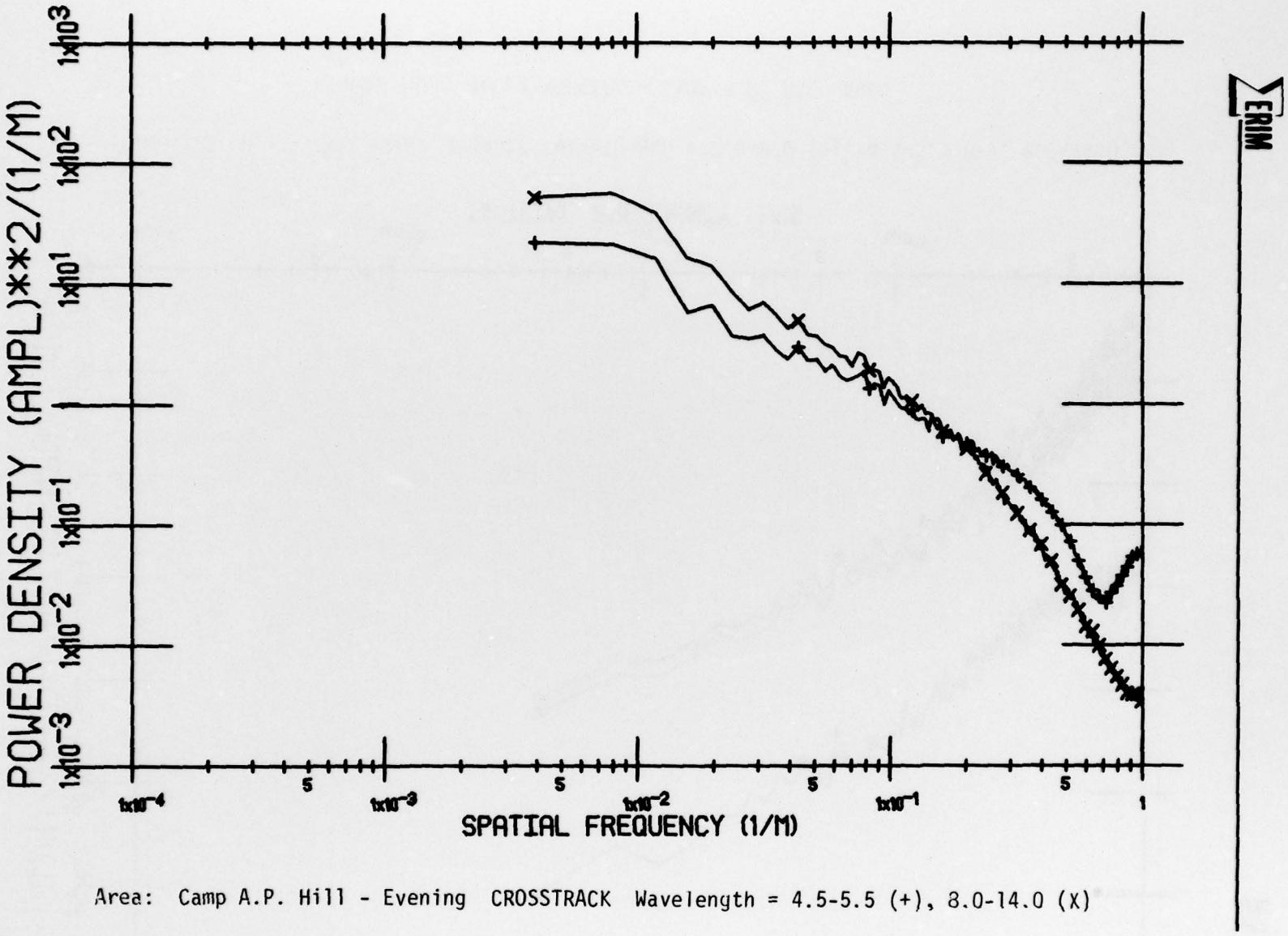
Area: Camp A.P. Hill - Afternoon CROSSTRACK Wavelength = 2.0-2.6 (*), 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 18a. POWER SPECTRA - CAMP A.P. HILL AREA



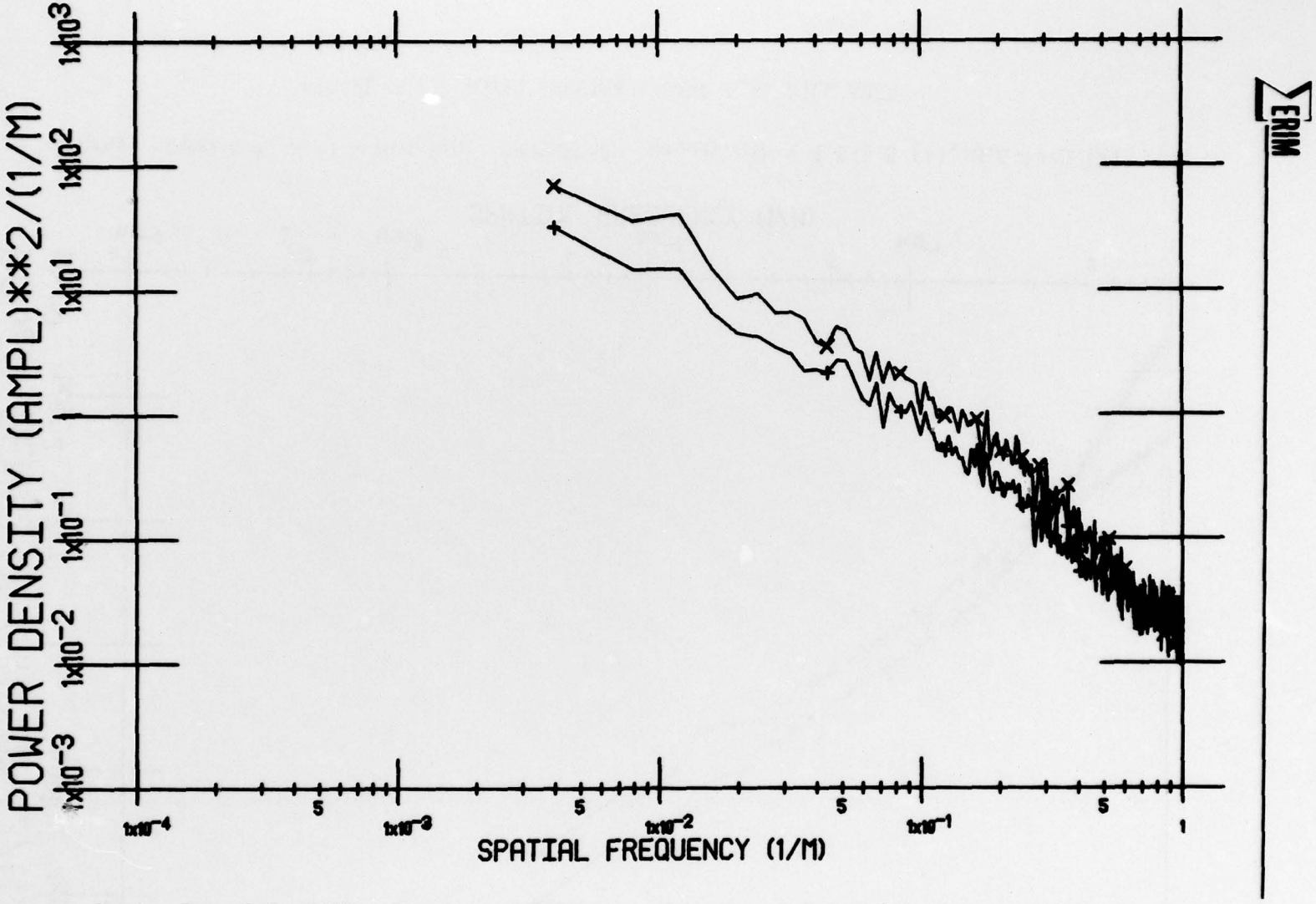
Area: Camp A.P. Hill- Afternoon INTRACK Wavelength = 2.0-2.6 (*), 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 18b. POWER SPECTRA - CAMP A.P. HILL AREA



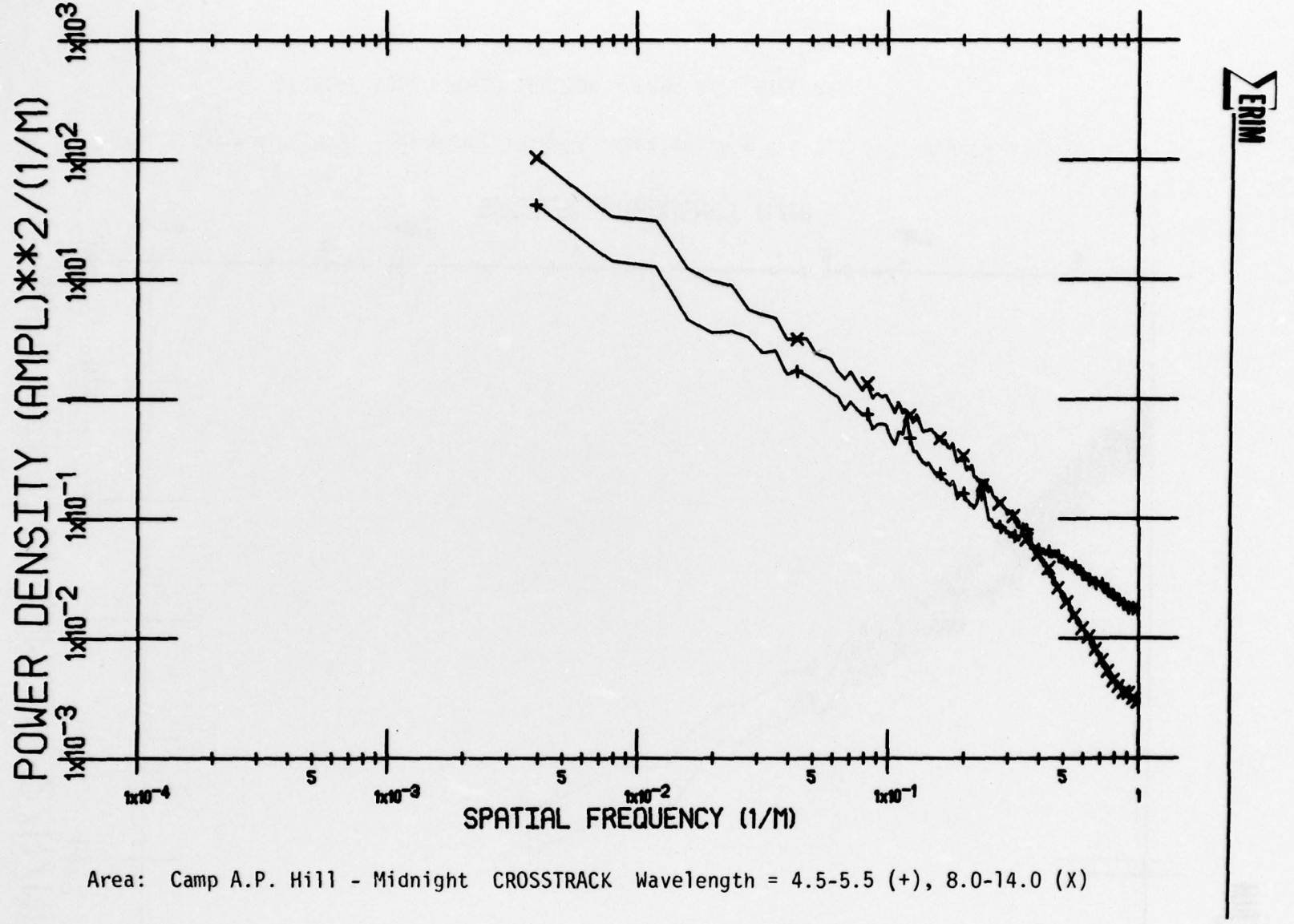
Area: Camp A.P. Hill - Evening CROSSTRACK Wavelength = 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 19a. POWER SPECTRA - CAMP A.P. HILL AREA



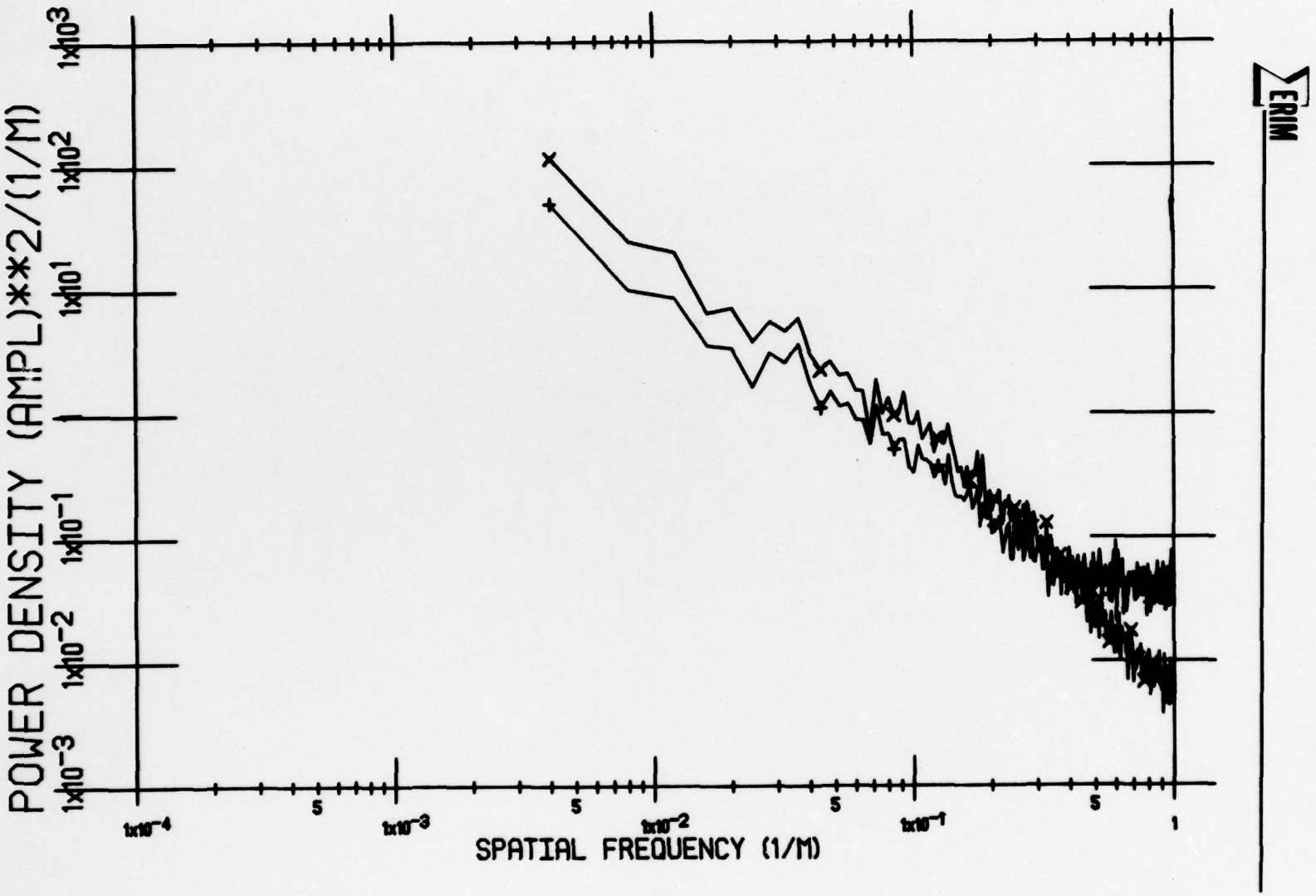
Area: Camp A.P. Hill - Evening INTRACK Wavelength = 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 19b. POWER SPECTRA - CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Midnight CROSSTRACK Wavelength = 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 20a. POWER SPECTRA - CAMP A.P. HILL AREA



Area: Camp A.P. Hill - Midnight INTRACK Wavelength = 4.5-5.5 (+), 8.0-14.0 (X)

FIGURE 20b. POWER SPECTRA - CAMP A.P. HILL AREA

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